S

COSTS AND BENEFITS OF AUTOMATING LIBRARY PROCESSES IN SMALL AND MEDIUM-SIZED LIBRARIES

STUDIES INITIATED BY THE ALBERTA PUBLIC LIBRARY DIRECTORS' COUNCIL AND JOINTLY FUNDED BY ALBERTA ADVANCED EDUCATION, ALBERTA CULTURE AND ALBERTA EDUCATION

CARRIED OUT BY LMG, THE LIBRARY MANAGEMENT GROUP INC.
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VOLUME I

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COSTS AND BENEFITS OF AUTOMATING LIBRARY PROCESS IN SMALL AND MEDIUM-SIZED LIBRARIES

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HISTORICAL NOTE

Following the publication of The Alberta Library Network Research Project discussions were held with representatives of the library community. These included the directors of the province's major libraries, representatives of various library associations and government departments. After the first meeting this group of people became the Alberta Library Network Assembly. Discussions and meetings continued and in late 1982 resulted in proposals for research funding being presented to the Interdepartmental Liaison Group on Library Development.

One of these, a test of electronic mail for use in requesting interlibrary loans among the universities, was to be funded by Alberta Advanced Education; one, a study of catalogue card services for school libraries, by Alberta Education.

This series of studies on Costs and Benefits of Automating Library Processes in Small and Medium-Sized Libraries was jointly funded by Alberta Advanced Education, Alberta Culture and Alberta Education. The studies should be of interest to colleges and large school divisions as well as to public libraries.

A number of groups were involved in defining and monitoring the research carried out by LMG, the Library Management Group, Inc. The idea for the project was that of the Alberta Public Library Directors' Council and that group drew up the specifications. St. Albert Public Library administered the funding needed to do the work. Alberta Culture Library Services Branch acted as the initiating department for contracting with St. Albert Public Library.

The monitoring group for the project was:

Chair:	V. Richards	Edmonton Public Library
	R. Denham	Parkland Regional Library
	P. Forsyth	St. Albert Public Library
	P. Galibois	Yellowhead Regional Library
	O. Gil	Alberta Culture Library Services
	W. Kenny	Fort McMurray Public Library
	W. Kurmey	Faculty of Library Science, University of Alberta
	R. Rowswell	Grant MacEwan Community College

NETWORK STUDIES FOR THE ALBERTA PUBLIC LIBRARY DIRECTORS' COUNCIL (APLDC)

SUMMARY PREPARED BY THE COMMITTEE MONITORING THE STUDIES ON THE COSTS AND BENEFITS OF AUTOMATING LIBRARY PROCESSES IN SMALL AND MEDIUM-SIZED LIBRARIES DONE BY LMG.

The specifications drawn up by the Network Studies' Committee, APLDC, focused on five areas. The studies meet the specifications set out. Each study includes an executive summary and a longer summary in conclusion. A large number of recommendations appear throughout the reports. Some arise from the data and others from the current environment of library automation. While each report is relatively self-contained, they should be used as an integrated series, in order to obtain the most useful information and impact. Because of the pressures of time, a small number of typographical errors survived. An errata sheet and an addenda sheet, plus sources of documentation, will be provided to supplement the studies. The survey instrument is added as an appendix to the first study.

I: THE AUTOMATION OF SMALLER PUBLIC LIBRARIES IN ALBERTA

This study examines the range of current costs in libraries in Alberta, for a number of functions. Comparisons with costs elsewhere have been made. In general, the Alberta public library costs were equal to, or somewhat lower than, those of other libraries studied. A number of suggestions for improved manual systems have been made, and some discussion of their costs is provided. The costs of substituting automated systems for present manual operations are also included. The conditions under which public libraries should consider automating are discussed, and a cost-benefit analysis model for comparative evaluation of present and proposed new systems in included.

Assessment:

The study is the longest one of the five and meets the specifications set out, with the exception of the cost ranges for improved manual systems. Because of the widely varying costs for a number of library functions currently carried out, and the improvements which could be made in manual methods, the consultants have wisely avoided being dogmatic about whether to automate or not. All necessary factors for arriving at policy decisions by individual libraries are included. Some of the pertinent costs which have to be considered are included in other reports. Each library seriously considering automation will need to carry out the use of the cost-benefit analysis model and arrive at conclusions related to its own operation. The most fruitful area for automating operations appears to be circulation. However, the model, while it can be used by a wide variety of libraries, is complex to use. Study sessions in its effective use would be valuable to all sections of the library community.

II: MICROCOMPUTERS FOR AUTOMATING BASIC LIBRARY OPERATIONS

The study investigates the availability of microcomputer-based systems for the automation of common library functions. Thirteen possible systems were identified and reviewed. They range from very inexpensive systems, which could be implemented for less than $10,000, to systems costing over $100,000. Systems were reviewed for functions provided, capacity, hardware requirements, price, product generation, maintenance and installation, communications' capabilities, and other matters. Several systems appear promising for Alberta libraries. In particular, school libraries and small public libraries appear to have available several working systems.

Assessment:

Sufficient details, particularly costs, have been given to allow interested libraries to focus on systems most pertinent to their needs. Locations of installed systems are given and the addresses, etc., of vendors. It should be a relatively easy matter for libraries to send requests for information to the vendors, using their responses in the cost-benefit analysis. Probable length of time and costs for data conversion are understandably not detailed for each of the micro-systems. A comparison can be made between various options and current costs, and a decision made on the next stage to be analysed.

III: MINICOMPUTER-BASED SYSTEMS FOR LIBRARY AUTOMATION

The Network Studies' Committee recognized that the larger target libraries' needs exceeded the capabilities of microcomputers while at the same time a stand-alone mini-based computer system would be too expensive. Therefore, this study was required to focus on shared installations, which help to reduce costs. The study looks at five shared installations, using five different vendor-systems and provides detailed information on all aspects. The study shows the advantages enjoyed by the members of a regional system. Cost-savings for members of a multi-library co-operative are addressed, along with some of the problems of co-operating, especially in governance.

Assessment:

Sufficient information is given to enable libraries, which wish to co-operate jointly in a mini-based computer system, to focus on possible options and to make the necessary decisions.

IV: COMPARATIVE COSTS FOR CATALOGUING SERVICES

The automation of library operations focuses generally on three areas: circulation control, shared cataloguing copy, and interlibrary-loan improvements. The Network Studies' Committee required an examination of comparative costs for cataloguing services from automated environments as well as other sources. Costs of obtaining cataloguing copy from UTLAS and other bibliographic utilities, as well as a number of commercial vendors, are discussed. Components of the cataloguing process are outlined, and various hidden costs explained. The study discusses the various sources, including analyses of the scope of databases, methods of access, prices, options available, retrospective conversion considerations, and other matters.

Assessment:

A significant difference between the costs of commercial services and bibliographical utilities appear; one which the consultants appear to gloss over. However, those libraries which use a variety of commercial services, carrying out the necessary additional work (which bibliographic utilities carry out directly), recognize that it still does not increase the cost of commercial vendors significantly. The difference in cost and services should receive detailed discussion within the Province.

V: POTENTIAL FUTURE INTERLIBRARY LOAN TRAFFIC AMONG ALBERTA LIBRARIES

A comparison of interlibrary loan traffic in Alberta, British Columbia, Great Britain, and other various areas of Europe and the United States, shows that a distinction can be drawn between relatively advanced and underdeveloped systems. Population projections for Alberta are examined and a number of possible scenarios for the future growth of interlibrary-loan traffic in Alberta are developed. Probable associated costs are given, as well as very specific loan-traffic statistics for a number of possibilities.

Assessment:

Ample information is given to enable useful discussions to take place. The probable volume of public libary interlibrary-loan traffic under various conditions will have a direct bearing on network solutions and should receive full discussion. Since most ILL traffic is generated by academic libraries, their involvement in such discussions will be vital.

OVERALL ASSESSMENT

Extensive debate will be needed to arrive at a general consensus about networking in Alberta, using all the studies to date including the Schick Report. Workshops and other methods of studying the reports and recommendations, and using the cost-benefit analysis model, should be fostered by various stake-holders in the library community.

COSTS AND BENEFITS OF AUTOMATING LIBRARY PROCESSES IN SMALL AND MEDIUM-SIZED LIBRARIES

VOLUME 1:

THE AUTOMATION OF SMALLER PUBLIC LIBRARIES IN ALBERTA

SURVEY INSTRUMENTATION FOR THE STUDIES

READINGS

THE AUTOMATION OF SMALLER PUBLIC LIBRARIES IN ALBERTA

A Study For

THE ALBERTA PUBLIC LIBRARY DIRECTORS' COUNCIL

By

Dr. David R. Williams

and

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LMG The Library Management Group Inc.

New Westminster, B.C.

March 1983

FOREWORD

Five studies were carried out by LMG Inc. following specifications drawn up by the Network Studies' Committee of the Alberta Public Library Directors' Council (APLDC). The Committee co-opted additional librarians to form a Project Review Committee for the studies.

Funding was provided by the Province of Alberta, through a Liaison Committee representing those interested in library networking in the ministries of Culture, Education, and Advanced Education. Approval for projects seeking funding was given by the Executive, Alberta Library Network Assembly. St. Albert Public Library Board agreed to hold the approved funds in trust until the completion of the studies.

Thanks are due to all these groups who made a successful conclusion possible. Much of the information in the studies should prove useful to school and college libraries, as well as public libraries in Alberta.

V. Richards
Chairman, Network Studies' Committee
Alberta Public Library Directors' Council

ACKNOWLEDGEMENTS

The consultants would like to thank the many people whose advice and assistance made these studies possible. The project committee members provided direction and guidance, also searching questions and lots of coffee. Pamela Forsyth and Ron Rowswell took on the additional burden of helping to clarify various responses from the libraries. Vince Richards kept everthing going and encouraged us to be speedy. Special thanks are due to the helpful and courteous librarians and their staffs, who answered our questions, replied to our mail and gave us generously of their time.

Paul Baldwin, Sharon Brunzel, Jay Clark, Jim Craven, Leslie Dieno, Margaret Friesen, John Gaumer, Olga Gill, Heather Harbord, Robert McClaren, Barbara Sanderson, Jim Scott, Joe Siqueira and Mary Westell provided additional documentation and information. We thank them for that. Finally we also note with gratitude, the many vendors of commercial systems who were willing to tell us about their products and plans, and sometimes about their prices.

EXECUTIVE OVERVIEW

The study examined the range of current costs in libraries of the province of Alberta, for a number of functions. Comparisons with costs elsewhere were made. In general, the Alberta public library costs were equal to or somewhat lower than those of other libraries studied.

A number of suggestions for improved manual systems have been included, and some discussion of their costs is provided. Costs of substituting automated systems for present manual operations are also included. The conditions under which public libraries should consider automating are discussed, and a cost benefit analysis model for comparative evaluation of present and proposed new systems is included.

A number of recommendations are proposed, under the headings of **Planning, Information, Finance, Management, Operations** and **General.**

A Glossary is also included.

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INTRODUCTION

This study is the first of a series of five, commissioned by the Alberta Public Library Directors' Council, whose overall objective is to provide information necessary to make decisions about future library networking in Alberta. The particular target group for whom this information was expected to be of use, comprised the small and medium sized public libraries in Alberta. In addition, it was expected that the studies would be so conducted, that other small public libraries, and Alberta college libraries could profit from the findings.

A total of twenty three libraries was examined as the primary focus of the study. They ranged from very small single branch public libraries, to very large multi branch regional systems. Fourteen were public libraries in Alberta, including the two regional libraries and the Marigold Library System. Three of the fourteen libraries were visited by the consultants. The eight college libraries in Alberta were also asked by the Project Review Committee to participate in the study. All but two did complete the project instrumentation. One regional library in British Columbia and two municipal libraries in the same province were also studied, for purposes of comparison. As part of the review of specific automated library systems, a further three co-operative library consortia were identified and studied.

General terms of reference were as follows:

a. To gather and analyse information necessary to make decisions about future library networking in Alberta

b. To complete the studies involved in advance of March 31, 1983, to permit time for any additional minor studies

c. To develop and administer project instruments to gather data in support of the specific objectives described below

d. To develop a model which would be usable by small and mid-size libraries for cost-benefit analysis of their systems

e. To propose any additional minor studies or data collection projects which may appear useful to the Alberta Public Library Directors' Council, based on the findings of the present project

f. To present specific recommendations based on the findings of each of the five individual studies

Specific objectives for each individual study were as follows:

Study 1.

a. To determine the range of present costs of manual circulation, cataloguing and acquisitions procedures

b. To make comparisons with costs in other parts of Canada

c. To determine the probable cost range for improved manual systems

d. To determine the full costs of substituting an automated system, including data conversion costs

e. To determine whether smaller libraries should automate some or all of their procedures, and under what circumstances

Study 2.

a. To determine comparative unsubsidized costs of typical alternative cataloguing services for public libraries in Alberta, serving populations from 10,000 to 50,000

Study 3.

a. To determine what micro and mini computer based systems exist for automating basic single library operations

b. To determine the cost of equipment, software and maintenance of such systems

c. To determine the realistic costs and timelines for data conversion

d. To identify specific installations and provide related information necessary for site visits

Study 4.

a. To determine the full operating, shared capital and probable data conversion costs to participants in a shared mini computer based library automation system

b. To touch upon possible governance methods and problems

Study 5.

a. To gather data on ILL traffic from states, provinces and other parts of the English speaking world

b. To determine Alberta's projected population growth over the next several decades

c. To determine the maximum potential inter library loan traffic that Alberta could experience for all types of libraries

The method of approach to these studies was as follows:

1. A Project Review Committee was established. Its membership included representatives from the Alberta Public Library Directors' Council, and one representative each from Alberta Culture, University of Alberta Faculty of Library Science and the Alberta College libraries. The committee was chaired by Mr. V. Richards, Director, Edmonton Public Libraries.

2. Relevant documentation was collected, with reference both to the Alberta library scene, and selectively for other areas. The comparative areas reviewed differed from study to study, but in general included Ontario, British Columbia, Washington, Illinois, Texas, and other areas of the United States, and Great Britain.

3. Study instrumentation was completed.

4. Mail and in library data collection procedures were established.

5. Three meetings were held between the consultants and the Project Review Committee, prior to completion of the studies, to ensure that the ultimate product would adequately address the objectives. At each meeting, progress to date on the studies was reviewed and approved by the Project Review Committee.

The timeline for completion of the studies was extremely limited. Instrumentation was developed in early January, and after review by the Project Review Committee was distributed to the target libraries in late January. Three libraries were visited during the same period. Collection of other data was carried out during January and February. This included documentation from and concerning over thirty vendors of automated library systems, and of cataloguing services. Five existing shared automated library systems were identified and approached for information. Three public libraries in British Columbia were identified for comparative purposes, and information was obtained from these also.

Analysis of this information was carried out during the same period. The studies were drafted, reviewed and refined during March.

Because the objectives of all five studies were linked, the final written reports to some degree overlap, and should be read in conjunction with one another. In particular, Study 1 incorporates a number of sections, such as the Recommendations, and the Instruments, which refer to the objectives of all five studies. Study 1, in a sense, in addition to addressing its specified objectives, has been used to integrate the whole series.

The data available were incomplete, for a number of reasons. The timelines themselves prevented the fully detailed investigation which the consultants would have preferred. In addition some libraries had difficulty providing all of the information requested. This was of particular concern in regard to data needed for the calculation of functional costs. In the case of commercial and semi commercial vendors, data gathering was complicated by two factors. In the first place, the pace of change in automted library systems is so rapid, that information becomes outdated very quickly, and verifying that information is accurate and up to date is difficult but essential. Secondly, many vendors are reluctant to release certain information, especially concerning costs, except in response to a Request For Bids for a specific installation. There are a number of sound reasons for their reticence, including the fact that costs do ususally vary according to factors unique to each library installation. To a large degree, the consultants were able to overcome this problem. Where a lacuna exists it is noted.

The cost range for present manual systems in the target libraries is very wide, reflecting the disparity which exists in the size, objectives and sophistication of members of the group reviewed. The multiplicity of automated systems which was examined reveals a similarly wide range of capabilities and costs. In effect they do offer a range of options which could profitably be investigated by all of the libraries, even the smallest, and including some mini computer based alternatives which would be too expensive for any individual library in the group, but which could be cost beneficial in a shared environment. There is at least one system which could be mounted on a municipal mainframe, for example.

The libraries studied differ considerably. A cost benefit model has been included which will permit each one or groups of libraries to examine further their local circumstances. The consultants believe that the information contained in these studies, together with local application of the cost benefit model will provide sufficient information on which libraries could base the issuance of a Request For Information. This is the next step which needs to be taken by those libraries whose plans for the future include an expectation that some functions will become computer based.

A number of regional and/or provincial decisions need to be made, before further steps can effectively be taken. These include consideration of the following:

1. Is resource sharing to be a primary, major objective of any automation program?

2. Is resource sharing to be actively or passively provided?

3. Is the provincial government to provide any support funding for capital and operating expenditures?

4. Is the provincial government to provide any element of direction?

5. Are co-operative automated ventures to be undertaken? If so, which libraries will comprise the various groups?

A word needs to be said about the sources of information used in the study. These numbered in the hundreds. First, of course, were the instruments completed by the libraries themselves. Additional documentation collected from the libraries included copies of operating budgets, personnel agreements and salary schedules, planning documents and special reports, and various pieces of descriptive literature. The Project Review Committee provided minutes and reports from other relevant committees. Alberta Culture provided considerable information, especially about inter library loan arrangements. Mary Westell, of the University of Calgary also provided helpful documents. Similar documentation about British Columbia libraries was obtained from B.C. agencies and libraries. We would like to thank all those concerned for their generous help.

A second source of voluminous documentation was the vendors, utilities and shared systems that were studied. In this case, written documents were supplemented with many personal interviews and telephone calls. A final source was the professional literature, both of librarianship and of computer developments. Those who are interested in further study will find these, especially the journals, productive.

The following section lists the libraries which were examined during the study, in various categories. Subsequent sections include a detailed review of each of these groups, together with an individual description of each of the three visited libraries, before analysis of the data gathered is provided. A series of tables summarises the information gained, amd presents certain cost comparisons between different subgroups of libraries, for various activities. A detailed model for cost benefit analysis procedures is explained and Appendix I contains the detailed layout sheets for the model. Appendix II contains a Glossary of some terms used in connection with library computer projects.

LIBRARIES SURVEYED IN THE STUDY

Alberta Libraries

Public Libraries Visited

Red Deer
St. Albert
Strathcona

Public Libraries Surveyed But Not Visited

Airdrie
Banff
Canmore
Fort McMurray
Fort Saskatchewan
Grande Prairie
Lethbridge
Medicine Hat

Regional and System Libraries

Marigold Library System
Parkland Regional Library
Yellowhead Regional Library

College and Technical Institute Libraries

Grande Prairie
Grant McEwan
Lethbridge
Medicine Hat
Mount Royal
NAIT
Red Deer
SAIT

Libraries in Other Jurisdictions

British Columbia - Two municipal libraries and one regional library

DESCRIPTION OF LIBRARIES SURVEYED

Visited Libraries

Red Deer Public Library

General Description

Red Deer is located in central Alberta, almost equidistant from Edmonton and Calgary. The public library serves an urban population of 48,562 together with a trading area of some 200,000. In the north part of the city, a separate, autonomous library has been established, under the name of Dawe Community Library. Red Deer provides some $62,000 financial support to Dawe, designated as follows:

Books	$10,000
Salaries	$32,000
Debenture	$12,000
Miscellaneous	$ 8,000

No other formal agreements exist between the two libraries, and there is little inter library loan or cross-over of borrowers between the two. Dawe has a large clientele of children. The two are only a few miles apart. The areas surrounding Red Deer are served by Parkland Regional Library, whose headquarters are in Lacombe, just north of Red Deer.

The library has a collection of some 68,000 titles in various formats. There are four professional librarians, plus seventeen and a half FTE staff. There is no employees' trade union, or technological change clause in the personnel policies. Total circulation in 1982 was some 288,000. No automated functions are presently in use, but some preparatory steps are being taken. The library has established a computer reserve fund, which in 1981 stood at $50,000. The city has a Univac 1160 computer with 526K of CPU memory and two MB on disk. Some discussion about possible library use of this system has taken place. However, the municipal system appears already to be in heavy use. In 1982, the total library budget was $587,600, or about $12.00 per capita.

Circulation procedures

The library uses a Recordak circulation system for books and records. All others are handled manually. There is a single library building with three circulation outlets. 4.45 FTE staff are employed to handle a circulation volume approaching 300,000. Use of the library is widespread, and it is thought that as many as 50% of the city and area population are users - a total of perhaps 35,000 patrons. The main problem in automating circulation would be building the data base. None of the patron data or bibliographic records are available in machine readable form. No master registration file of borrowers has been kept.

Cataloguing procedures

Cataloguing is done manually. 2200 titles, and 2400 items are catalogued in house annually. Card sets are purchased for another 5400, from Baker and Taylor. Two FTE staff are employed. Here too, the main difficulty in automating will be in building the data base. Only recently has the library kept enough information on the shelf list to permit a relatively speedy effort at retrospective conversion, and probably only 10% of the cataloguing records have enough information to provide a "hit" in a RECON project. Much RECON would entail physical inspection of the materials. However, some retrospective maintenance has now been undertaken. Introduction of an authority system would pose some problems, but provision of a simple system that would just provide cards would not be difficult. The library prefers an on-line catalogue to either COM or microfilm. The library would give a higher priority to automation of cataloguing if it provided an on-line catalogue, but not if it simply provided cards. In any event, automation of cataloguing is ranked lower than automation of circulation.

Acquisitions procedures

a. Monographs.

The library purchases some 7750 titles and about 8850 items annually, with an FTE staff of 1.1. All procedures are manual. All procedures are carried out by the library, without municipal involvement. Automation of the system is ranked at about the same level as cataloguing.

b. Serials.

A kardex system was introduced in 1983. Only 0.1 FTE are used for this function. All procedures are manual. Serials do not appear in the public catalogue. There is some interest in automating the serials function.

Inter Library Loan

Red Deer is a provincial resource library, and is a net lender. Loans in 1982 totalled 1306, and 541 items were borrowed. Main sources for Red Deer were Calgary and Edmonton Public Libraries, the University of Alberta Extension Department, Parkland Regional Library and Lethbridge Public Library. Main borrowing libraries were Coronation, Consort, Camrose, Wetaskiwin and Parkland. One full time staff member is employed on this function, including the Zenith line.

Attitudes to Automation

The library has recently become interested in automating functions, particularly circulation. The existence of a municipal Univac 1160 has led to some discussion of its possible utility, but this is at present a relatively small installation, and quite heavily used. One system which should be investigated is the MSUS/PALS (MANKATO) system, presently being mounted by Lethbridge on a municipal UNIVAC. The system is specifically designed to run on the UNIVAC 1100 series, for which it requires no modification. The system offers a full range of functions.

There is some possibility that a larger computer will be purchased by the city. Possible partners in a shared computer venture, if not through the city, would include Parkland Regional, Dawe Library, and a number of surrounding smaller libraries, as well as Red Deer College.

General Comments.

The library is not yet sufficiently well prepared for introduction of automated systems, although it has begun some preliminary steps, including costing of manual systems. Virtually no usable data bases exist. Most of the staff would require considerable training, a point that was raised several times. However, the circulation volume is large enough in a single building to justify automation of this function. Red Deer is an example of a mid sized library which could well benefit from the implementation of automated systems, in co-operation with nearby libraries. Neighbouring libraries are close enough that communications costs should not be exorbitant.

St. Albert Public Library

General Description

St. Albert is located on the northern fringes of Edmonton. The library serves an urban population of 33,000 from a single outlet with a collection of 54,900 items. A small local history collection is maintained, along with both juvenile and adult paperbacks. There are 17.3 FTE staff, of whom four are professional librarians. There is no union and no technological change clause appears in the personnel policies. The total circulation in 1982 was almost 266,000. The 1982 library budget was close to $500,000 or about $15.00 per capita.

None of the library's functions are at present automated, but such automation is under active consideration. In 1982 the Library prepared a projection paper for the period 1983-1992. The introduction of automated techniques was given a priority. There is a line item in the budget for automation consulting services, but no automation reserve fund.

The library is now housed in temporary quarters in a shopping mall. New space of some 25,000 square feet is planned for Fall 1983. This space will be in a new municipal centre presently under construction. In this new space the library will be close to the city's computing facility. At present that facility uses a Microdata 8000, a large mini computer with 512K RAM and 514 MB ofdisk storage. The city is planning for the purchase of a new Prime mini computer with 2 MB of main memory. Either the Microdata or the Prime is capable of running the Computer Technology Incorporated (CTI) turnkey circulation system.

Circulation procedures

The library uses a Recordak circulation system to control circulation transactions. 4.33 FTE staff handle a circulation of over 265,000, a population per capita level of 8.03. The comment was made that the present system makes access to what has been borrowed or identification of borrowers very difficult. Both requests and the production of overdues are in the 5000 range annually. Renewals are counted as a circulation transaction and not separately identified. Sorting was noted as a labour intensive process. Automation of this function has high priority.

Cataloguing procedures

Cataloguing is a manual procedure. 7312 titles (9345 items) were added to the collection in 1982. Card sets were purchased from Baker and Taylor and National Book Centre for almost 4000 titles with in house cataloguing prepared for the balance. 1116 items were catalogued from the title page and copy was located for 880. 1.55 FTE staff are employed in cataloguing and processing. There is a backlog of 3,500 volumes, about three months work. It is expected that the acquisitions level, and hence the cataloguing backlog, will decrease in 1983. Approximately 30,000 cards are filed annually. Name authorities are maintained only for those names which require cross references. LC and Canadian Subject Headings are controlled through an in-house subject authority file. Cataloguing and classification practice is well defined and some local options, such as the classification of law and Indian material, are followed. The library foresees some difficulties in implementing a shared automated system because of the differences in cataloguing standards. This library attaches a higher priority to the automation of circulation because of the great pressure developing in that area, but does not wish to build an automated circulation system based on the present quality of bibliographic records. For this reason automation of the cataloguing function is expected to be done in conjunction with automation of circulation.

Acquisitions procedures

a. Monographs.

The library uses a manual system consisting of on order files arranged by main entry heading and by order number. Copies of on order slips are filed in the public catalogue. The system permits library staff to ascertain the status of any on order or in process item immediately. In 1982 7300 titles (9600 items) were received using 2 FTE staff. Commitment and expenditure records are maintained by the Library The City Hall maintains expenditure records as well. The library comments that the present system results in poor choice of entry for order records, which causes consequent difficulties in placing on order records in the public catalogue. In addition the system is seen as providing poor management information and poor fund control. There are frequent differences between library expenditure records and those maintained by the City. A lower priority is attached to automation of this function because the Library believes the level of ordering will decline and also because both cataloguing and circulation systems are under greater strain and have more direct contact with library users.

b. Serials.

A central kardex is used to control 229 serials subscriptions. 0.25 FTE staff are employed in this function. Most serials are ordered through Canebsco, with some direct orders to publishers. Periodicals are not catalogued, but separate lists of childrens' and adult holdings are produced annually and semi-annually respectively.

Inter Library Loan

St. Albert is a net borrowing library. 553 items were borrowed in 1982 and 6 items were lent. Main sources of ILL were the University of Alberta, Edmonton, Calgary, Strathcona and Lethbridge Public Libraries, and Parkland Regional Library. 0.2 of a staff member is allocated to this function and the library states that ILL is not an advertised service. There is an informal agreement with Strathcona Municipal Library and the Fort Saskatchewan Public Library for the interloan of large print books. The Zenith line to the Edmonton Public Library is used only for reference questions.

Attitudes to Automation

The library has attached a high priority to the automation of certain library functions, as evidenced by the inclusion of this goal in its ten year planning document as well as the placement of funds for an automation consultant in the current budget. Circulation and cataloguing are seen as the first target functions and to this end the library has begun to place numerical search keys on current cataloguing in order to facilitate eventual conversion of records. Circulation volume from a single outlet is certainly large enough to justify automation of this function. The library could possibly have convenient same-building access to a city computing facility, but this possibility has not yet been seriously investigated. The comment was made that the city manager was "knowledgeable and willing to help in library automation." At the present time no funds are being accumulated in an automation fund.

General Comments.

As indicated previously the attitue toward automation is favourable in this library. The will is certainly there along with a workload that would, in all probability, justify such automation particularly in the area of circulation. Some consideration has been given to the possibility of system sharing with Fort Saskatchewan Public Library and the Strathcona Municipal Library. Informal discussions appear to have been held along this line. The distances between these libraries are such that communications costs should not prove a barrier. Edmonton Public Library and Yellowhead Regional Library are also both close enough to be possible partners in future projects.

Strathcona County Library

General Description

The County of Strathcona Municipal Library serves a population of 49,000, including 29,000 county residents and 20,000 living in unincorporated Sherwood Park. The library operates from one 18,000 square foot outlet located in the County Administration Building. There is some indication that the library will have to vacate these premises in the near future as the county requires expanded quarters for its general administrative operations.

The county has recently been involved in an annexation controversy with the City of Edmonton. The outcome resulted in the loss of 20 million dollars from the assessed county tax base. This loss of assessment appears to have had some impact on levels of support for the library.

The library has a collection of over 126,000 of various formats, including substantial audio-visual holdings. There are 26.75 FTE staff. Although some county workers are unionized, the library presently has no union. There is no technological change clause in the handbook of policies for classified personnel. Total circulation in 1982 was 472,000 for a per capita circulation of 9.8. No library functions are directly automated although the library has a terminal which permits direct input into the county accounting system. This facilitates input of financial information connected with the materials acquisition function. The county has a DEC 2060 system, but no formal discussions have been held which might lead to library use of this hardware. In 1982 the total library budget was $713,000 or about $14.85 per capita.

Circulation procedures

The Library uses a Recordak system to control circulation transactions which totalled 472,000 in 1982. The vast majority of the transactions, 432,000, were for materials circulated from the main library. The balance were circulated from the bookmobile. Requests were at the 8,500 level and over 20,000 overdue and fine notices were issued. 7.8 staff, excluding pages, were employed to handle this circulation load. The present circulation system was characterized as "very time consuming". The statement was also made that the system was "getting near to collapse". While automation of this function enjoys a high priority in ranking of different automation possibilities, the library considers that a new building has the highest priority, and stated that bibliographic control enjoys a higher automation priority than circulation.

Cataloguing procedures

5700 new titles were catalogued in 1982 together with almost 600 added volumes/copies and reclassifications. Card sets were ordered from the National Book Centre for over 80% of these. Information supplied by the library would indicate that a total of 0.84 FTE staff are employed to carry out the functions associated with cataloguing. 0.4 FTE semi professional staff is used for original cataloguing, which amounted to 900 titles in 1982. 0.44 FTE (three actual staff members) handle almost 5000 card sets for copy cataloguing. The library has no cataloguing backlog. Catalogue records purchased from NBC carry sufficient numerical search keys to permit machine searching of data bases for retrospective conversion. Most cataloguing prepared in house carries an ISBN number only. A name authority file is maintained for adult and juvenile materials. Subject authority control is maintained through the use of the 9th edition of the Library of Congress List of Subject Headings together with updates to that listing. In the area of automation the highest priority is attached to the automation of the cataloguing function.

Acquisitions procedures

a. Monographs.

Manual procedures are used to control the acquisitions process. 16,600 items, representing 12,500 titles, were purchased in 1982, with an FTE staff of 0.35. 6,300 of the total titles were paperbacks. Searching procedures are carried out by public service staff who are included in the FTE figure. Ten separate acquisitions fund accounts are controlled. The library has direct terminal access to the county's automated accounting system and inputs commitment and expenditure figures, while passing invoices to the county accounts payable section for payment. The present system is characterized as time consuming, but accurate and inexpensive. Monograph acquisitions ranks below circulation and cataloguing in the automation priority list of this library.

b. Serials.

A kardex record system is used to control the acquisitions and receipt of 357 periodical subscriptions and 241 standing orders (143 telephone directories). 0.33 FTE staff are used. System House (Calgary) is used as a serials agent.Standing orders and subscription holdings appear in the public catalogue. According to the library the present manual serials control system appears to have no serious disadvantages and serials is at the bottom of the list as far as automation priority is concerned.

Inter Library Loan

Strathcona County is a net borrower by a slight margin, borrowing 441 items and lending 354 items in 1982. Major sources for Strathcona borrowing are the University of Alberta Extension Library, Calgary, Edmonton, Lethbridge and Red Deer Public Libraries and the Parkland Regional Library. 0.42 FTE staff are involved in ILL activity. The library notes that, in addition to ILL related questions, it would use information on the holdings of other libraries for acquisitions decisions.

Attitudes to Automation

The library has had an interest in the automation of functions for some time, and commissioned an automation feasibility study in 1979. It is highly likely that automation of some functions would already have taken place had the county not become involved in the annexation dispute with Edmonton. The library has clear priorities for automation of functions, with cataloguing leading the way to provide a data base and circulation to follow. Strathcona considers the possibility of automating other functions as possible but not essential at the moment.

General Comments.

The library is as well prepared as any in the target group, to become involved in automation. The manual data base is well constructed and carries some numerical search keys that will facilitate retrospective conversion. Much of the preliminary investigation was carried out in the 1979 Ball study and although some of the information in that report is outdated, it could easily be rejuvenated. Some informal discussions have already apparently been conducted on the subject of automation cooperation between Strathcona, St. Albert and Fort Saskatchewan. It is obvious that a first step which might well be investigated would be a sharing of the Edmonton Public Library's CLSI system. Local political considerations could well rule out that possibility. Another alternative could be some joint development with Yellowhead Regional Library. It would appear that Strathcona will have to solve its building concerns, as well as recover from the annexation battle before concrete steps are taken in the area of automation.

Summary of Visited Libraries

The visited libraries were all single outlet medium sized public libraries located in the northern half of the province. Two are each close to both Edmonton and Yellowhead Regional Library. One is close to Parkland Regional Library. They serve populations of between 30-50,000 with per capita support varying between $12-15 annually. The collections number from 1.4 items per capita in Red Deer to 2.6 in Strathcona. Circulation levels are 5.9 per capita in Red Deer, 8.03 in St. Albert and 9.8 in Strathcona. All have total annual circulations in excess of 250,000. Annual acquisitions are between three and twelve thousand titles and two of the libraries control about 300 periodical subscriptions. Strathcona exceeds that level by a considerable margin.

Each of the libraries borrows about 500 items yearly through the ILL arrangement funded by Alberta Culture. Red Deer is a net lender, St. Albert a net borrower and Strathcona roughly in balance. None of the libraries appeared to publicize ILL as a service. In most instances it is seen as an adjunct to the reference, rather than the circulation service.

These libraries are aware of current developments and thinking in library automation. They all use Recordak systems for circulation control and feel that this system is now inadequate to cope with expected circulation levels. Cataloguing standards are good, and in two of the libraries records generally contain the numerical search keys that so greatly facilitate retrospective conversion. Red Deer might have some problem with older records in this regard. They all purchase substantial numbers of commercially prepared catalogue card sets and follow the Anglo American Cataloguing Rules for cataloguing copy prepared in house. Authority control is not a strong point, and all have some in house variations, if only in older cataloguing. These variations would have to be considered in the implementation of any shared system. All are willing to consider the use of a shared system and have access to municipal computers. No discussion has taken place as to the possibility of mounting library software on those facilities. With the exception of St. Albert's contact with Edmonton Public Library, we were not able to discover that any systematic discussion has recently been held with local automated libraries with a view to possible sharing of those systems. This might be possible in the case of Edmonton Public. There is reason to think, however, that Edmonton's local plans for automated development would render it unable to respond positively to overtures from other library systems in the immediate future.

All three of the visited libraries are close enough to one of the two regional libraries that some form of co-operation in the development of automation could be considered. If the pattern of the North Suburban Library System in Illinois, which is based on CLSI, were followed, a joint development of each of these, together with Edmonton Public Library might be explored.

REGIONAL AND SYSTEM LIBRARIES

Introduction.

There are two regional libraries and one library system in Alberta. They are the Marigold Library System, Parkland Regional Library and Yellowhead Regional Library. All three responded to the survey instrumentation, and a number of analyses of the resulting information have been carried out.

The differences between these three shared library organizations and the other libraries surveyed, however, make some comparisons invalid. For example, questions of circulation and inter library loan are complicated by inter branch transactions, and the difference between circulation from headquarters of materials to the various branches, and circulation to borrowers at the branches themselves. Similarly, serials collections may or may not be administered in their entirety at headquarters, or at the branches. For these reasons, the calculations given for these libraries do not include all those made for the remaining group.

Some of the possible comparisons, though, are very valid. Because two of these libraries are operating automated systems for at least cataloguing support, an Alberta comparison between manual and automated systems is possible. In addition, staff levels, budgets and a number of miscellaneous data provide useful insights. These are detailed in the tables.

General description

The three library systems are located in south central Alberta, generally covering the more populated areas between and to either side of Edmonton and Calgary. Populations served range from Marigold's 50,000 to over 100,000 in Yellowhead. Farthest distance between outlets in Marigold is nearly 400 miles. In Yellowhead the figure is about 170 miles. Parkland's farthest distance is 150 miles. The number of member libraries ranges from 25 public library branches in Marigold, to 31 public, and over 70 school libraries in Yellowhead. Marigold, established in 1981, has only public library members. Yellowhead was established in 1971, and Parkland in 1959. The Marigold bookstock headquarters numbers 7800 titles, or 15,800 items, excluding paperbacks. The total member library collections amount to some 50,000 titles, or 95,000 items. For Yellowhead, the block collection numbers 10,820 items. Member library collections total 210,000 items. Parkland has 335,000 items, and a very small headquarters collection.

Per capita funding for the three library systems varies considerably. The 1982 operating budget for Marigold was $682,500, some $13.65 per capita. For Yellowhead, the 1982 operating expenditures were approximately $883,000, or $8.25 per capita. Parkland's 1982 budget was $898,389, equivalent to a per capita of $9.98.

Circulation procedures

All three systems are presently using manual circulation systems. In establishing circulation levels for these libraries, both the volume at member libraries - schools and public - and any transactions at system headquarters need to be considered. The latter in turn, may include a number of different types of transaction. Several sources of information were used. They included the completed instruments returned by the libraries, and various attachments, and also Alberta Culture Library Statistics, for 1980 and 1981. Inconsistencies, ommissions, and differences of definition between the libraries, made full analysis of these figures subject to error. Accordingly, no attempt was made to cost these operations in these groupings. The following figures record the general levels reported.

At Marigold, 6100 books, 4500 blocks, and 1000 "permanent" loans were made in 1982. Total member circulations amounted to 210,258 that year. For Yellowhead, total circulation reported by Alberta Culture in 1982 was 322,750. Headquarters circulation could not be accurately determined, in part because HQ functions primarily as a shipping and distribution centre, rather than for circulation per se to any great extent. Parkland's own report for this study gave a total circulation of 1,250,000. However, the figure reported by Alberta Culture for 1981 was 259,268, and an enclosure from Parkland for the same year gave 260,735. The reason for this discrepancy apparently is that the lower figure did not include school library figures.

The total volume of circulation in these three systems is not high enough, with the technology presently available, to warrant serious consideration of linked automated circulation systems as part of a planned program of development in the automation of basic library operations, during the next five years. In addition to the question of circulation volume, the distance between outlets, apart from those closest to headquarters, exceeds the optimum maximum distance with present technology. A typical member library annual circulation figure ranges from less than 20,000 to 70,000. A more feasible approach may well be the utilization of stand alone micro computer based circulation systems for some of the outlets. Headquarters circulation may be amenable to automation as part of the implementation of other applications.

Cataloguing procedures

As has been the case in many regional type library systems, automation has advanced most rapidly in this area. Two of the libraries have automated their cataloguing services, Yellowhead with EasyData, and Marigold with MINISIS. Parkland is using manual procedures. The level of cataloguing activity ranges from 4420 titles (9507 items) annually at Marigold, to 12,000 (25,000 items) at Yellowhead. A backlog which exists at Marigold is considered to be a problem, but is not increasing. Yellowhead and Parkland have no substantial cataloguing backlog, although Parkland has one in processing.

Yellowhead uses its system to produce a microfiche catalogue, as is the plan at Marigold. Parkland maintains a card catalogue.

Acquisitions procedures

a. Monographs

The level of acquisitions ranges from 23,000 items in Marigold to 52,000 in Parkland. Marigold uses its MINISIS system to provide an automated acquisitions application. Yellowhead is also using an automated system, although approximately 6,000 orders per year are still handled manually. Yellowhead also continues to file on order slips. Parkland operates manually.

Like most regional systems, theses libraries are quite autonomous in the purchasing process for library materials, and are required to go through no municipal or other intermediary.

b. Serials

As for circulation, analysis of the serials function is complicated by the fact that substantial collections are likely to be held at, and perhaps completely administered by, some or all of the member libraries. In general, the three systems are using manual procedures, although Marigold plans soon to add their serials on line to their MINISIS system. Although the full extent of serials work, and disparities among the three systems are not fully apparent, it is worth noting that Parkland, for example, fully controls at headquarters a collection of 100, but there are 1600 in the system for which invoices are paid centrally.

Inter library loan

Many of the transactions which in a different environment would be inter library loans, become transmuted in a regional library system to be recorded as regular circulation statistics, or perhaps as requests/holds. One would expect, therefore, that the level of ILL in regional libraries might be less than would be the case in a similar area which had not joined together. That this may be changed again by the advent of automation is demonstrated by the figures available from the North Suburban Library System, which are addressed in Studies 4 and 5.

All three libraries are considered to be resource centres for the Alberta Culture Inter Library Loan and Zenith Agreements. Parkland and Yellowhead have written letters of understanding.

Marigold states that "we are considered a resource centre for Alberta ILL, and are totally committed to resource sharing."

The reported transactions do not unambiguously distinguish between different categories of loan, such as xerox pages, monographs, serial articles etc., and few conclusions can be drawn from the data that are available. One might speculate that much of what would have been inter library loan has become in region circulation. In 1982, Yellowhead lent 231 items on inter library loan to libraries outside the system, and borrowed 1015. Parkland lent 538 outside the system and borrowed 431. Both Parkland and Yellowhead use Edmonton and Calgary Public Libraries, and the University of Alberta as major sources. Marigold lent 35, and borrowed 5880, primarily from Edmonton, Calgary, Medicine Hat and Red Deer. Marigold expresses confidence that this pattern of ILL will change once the system union catalogue is in place.

Attitudes to automation

All three have placed a priority on the automation of cataloguing services, and, de facto in two cases, on acquisitions. In conjunction with this development, two of the systems are using or planning to use microfiche catalogues. A relatively low priority has been assigned to the automation of circulation. Marigold did consider the automation of this function, but considered that its priorities lay elsewhere. In addition the cost of on line communications was high. There is some indication, however, that even if member outlet circulation operations are not immediately to be automated, the headquarters function may be transferred to computer mode. Marigold is likely to automate at least some parts of the serials operation in the near future.

No opinion was expressed on the possibility of joint automated developments with other libraries or library systems, or of extending their existing automated systems to surrounding libraries.

General comments

The three library systems are diverse in many ways - in size, in membership, in age, in funding, in governance. All three, however, display a similar interest and need for automated systems, albeit the type and degree of implementation is also varied. All have placed similar priorities in sequence of implementation. Both Yellowhead and Marigold turned to automation immediately upon establishment.

These three display in microcosm the problems which confront the target libraries as a whole. The salience of resource sharing is an a priori for the existence of shared library systems, yet within the organizational matrix, many other fundamental tasks must be accomplished to permit it, and at times, even over protracted periods, assuming a higher degree of urgency.

It is to be noted that the success to date of these libraries in part results from the co-operation permitted or enforced in the shared environment, with a centralized authority, maintaining at least some degree of control. In this connection one might speculate on the future development of libraries in the proto-Oldman region, and how it might have developed in contrast within the embrace of a central system leadership.

Future automated development in the three library systems may well proceed as independently as it has in the past. However, there would be benefits to be gained for other libraries in associating in some fashion with these plans, as there would be for the regional libraries and the system library themselves in looking to partners for the future.

The problem of automation in these libraries requires more analysis than was possible in this study, aimed primarily as it was at small and medium sized libraries. The regional/system libraries are large and have somewhat different problems. The study only indirectly applies to this group. Only limited comparisons can be made between these libraries and the primary target group of the study.

Other Unvisited Public Libraries

Introduction.

In addition to the system and regional libraries there were eight public libraries which were studied but not visited. These libraries were spread throughout the province. All but one completed and returned the study instrumentation. For the single exception, various other documentation was acquired and used so that at least some comparative analyses could be carried out. The completeness and accuracy of the data supplied varied. Because many of these are small libraries, some aspects of record and statistics keeping which are done in larger libraries are not able to be carried out. Consequently, in some instances, estimates rather than actual counts had to be used.

General description

Of these eight libraries, the smallest was Canmore, serving a population of 3600. The largest was Lethbridge, with a population of 56,400. All of these libraries are single branch organizations. Typically, these libraries have a close relationship with their municipal authorities, this sometimes including the assumption by the municipality of various invoicing, cheque payment, and other financial responsibilities.

Book stocks in the libraries range from a little over 10,000 in the smaller libraries to 170,000 at the high end. The next highest to this is about 90,000. Many of the small libraries are characterized by very limited staff resources, relying on one or two staff members, all employing a professional librarian, and some utilizing volunteer help. Only the largest of the eight has a unionized staff. Often salary reviews and working conditions are linked to municipal settlements. In at least one instance this has led to some concern as recent financial constraints have resulted in violation of this traditional parity.

In 1982, the largest of the libraries had an operating budget of $1,325,000, a per capita rate of $23.50. The smallest had an operating budget of $51,950, a per capita rate of $14.11. At least one of the libraries has established an automation reserve fund.

Only one of the eight libraries as yet has installed an automated system. This is an acquisitions package utilizing DB Master, running on an Apple II. Another is in process of implementing an automated system which will provide cataloguing and on line access, with circulation, acquisitions and serials control modules expected to be made available by the vendor within the next twelve months. It will run on the municipal UNIVAC. The remaining six are not yet developing any automated systems.

Circulation procedures

Two of the libraries are using Recordak circulation systems. The remaining six all operate manually. Annual volume of transactions ranges from about 15,000 to 559,000. Most of the eight have levels between 100,000 and 300,000.

Because these are all single outlet libraries, the circulation volume, except in the smallest ones, has reached, or is approaching a level at which automation can often be demonstrated as cost efficient, even in a stand alone system. In contrast to the regional libraries, these eight do not have the same cataloguing volume to contend with, nor the same requirement for multiple copies of a union catalogue. Consequently, automation of circulation as the first priority could be contemplated, although the libraries would be well advised to consider their possible future development, when establishing the type of record which would be used in such a system.

As an interim measure, those libraries which are now using manual circulation procedures might investigate purchasing a microform system. However, volume is still low enough in these, that there is no real urgency to this development. Furthermore the existence of very inexpensive, micro computer based automated circulation packages may mean that even these libraries could go directly from manual to computer based circulation procedures.

Cataloguing procedures

All of the libraries are using manual cataloguing procedures. Several of them were not able to state with certainty the number of items or titles catalogued annually. The figures which were available suggest that the typical volume ranges from 1,000 to 4,000 annually. The two largest libraries considerably exceed this, with an annual level around 10 to 12,000 items. Few have a significant backlog, despite relatively low staff levels. This level ranges down from 3.0 FTE, with the majority using from less than one to a little less than two FTE staff. Some of the libraries do all cataloguing in house. A number purchase card sets, from 1,000 to 7,000 annually.

Each member of this group maintains a card catalogue, though one library expects to implement an on line public access catalogue soon. Each uses AACR II, and sustains a reasonably high level of cataloguing. The use of a formal authorities system can, in most instances, be described as at most partial, and often sporadic. None has developed a machine readable data base as such, but many are including numerical search keys in their card format records. However, few libraries have yet developed the kind of record keeping system which would enable a truly comprehensive, accurate and valid, detailed cost analysis to be performed, in order to assess the justification for introduction of an automated system. Some valid cost analyses are possible.

Acquisitions procedures

a. Monographs

The analysis of data on this topic was made difficult by the lack of complete records in many of the eight libraries. Some of the statistics which are desirable include, number searched, number ordered, and number received, both by title and by item. This is necessary in order to obtain a complete picture of staff activity. In no case was all of this information available, and in most cases, only a small proportion could be given. Typically, statistics are kept for either titles or items but not both. The most complete records related to titles or items received. This lack of consistency required that comparative analyses be made with caution.

Seven libraries of the group are using manual acquisitions procedures. The eighth has implemented a micro based system. This library acquires about 6,000 items a year using this system, and expresses satisfaction with its performance. The remainder acquire from less than a thousand titles to 21,000 titles annually.

b. Serials

All of the libraries are operating manual serials systems. However, one library uses a nearby academic library's automated facilities to prepare an annual serials list. The largest library acquires 500 subscription plus 1500 standing orders yearly. The next highest purchases 265 subscriptions, but no standing orders. The remainder range from about 20 to some 150 subscriptions. Most have few standing orders. With the exception of two libraries, all use a serials agent for the bulk of their subscriptions. Few staff are assigned to this function. As was the case for monograph acquisitions, the statistical information available was not detailed.

Inter library loan

There are three net lenders in the system, two being provincially designated resource centres. The remainder are heavily net borrowers. Typically, for this group, the number of items loaned is less than 10. The number borrowed ranges from about 350 to 768. The sources of inter library loan are virtually the same for each of the eight libraries. They are Calgary and Edmonton Public Libraries, and the University of Alberta, reflecting these libraries' position in the Alberta inter library loan organization. Such a pattern, however, is also very typical of any jurisdiction which lacks a union catalogue. Net borrowers naturally turn to the large libraries. That pattern could be expected to change substantially, however, if location information covering a wider group of libraries were available, whether in COM or on line mode. It is worth noting that the regional libraries are not used as major sources of inter library loan. This also might be expected to change, if the regional systems' collections become widely accessible as a consequence of the establishment of automated systems.

One reason for such potential changes of pattern is the probable existence in smaller libraries of unique titles not held in the existing net lending libraries. This probability in itself also has implications for the time, cost and relative difficulty of constructing machine readable data bases in retrospective conversion projects. However, since there is duplication of many titles in the smaller and larger libraries, a machine based inter library loan system would result in many libraries turning to the snaller but closer libraries as sources, in the expectation of receiving quicker service. This change of pattern has been noticed in every jurisdiction where a machine based system has been introduced. At that point, the new pressure on smaller libraries can be expected to create its own set of problems. Location and delivery of inter library loan material is still labour intensive, and small libraries have sometimes encountered difficulties in dealing with the increased workload.

There is one example in the grouping of a union catalogue incorporating the holdings of two libraries - a public and a college library. This project appears to be terminating, because the college library is moving from a manual to an automated catloguing system, using UTLAS.

Attitudes to automation

The eight libraries in this grouping display a number of similarities in their attitudes to automation. In some respects, however, two different groups can be discerned, to some degree associated with size. Only one library, among the larger ones, but not the largest, has actually implemented an automated system. This is a micro computer data base management system, which is used to process an acquisitions level of some 6,000 items annually. The largest library in the group is well advanced with plans to mount a turnkey library system on the municipal computer, in order to automate cataloguing, implement a public access catalogue, and at some point automate circulation, acquisitions and serials management. A third, larger member of the group has carried out a cost analysis of cataloguing for the library, utilizing the Toronto based UTLAS system, but has not to date implemented this change. None of the libraries appears to be using computers for any generalized, non library specific applications, except to the extent that this may be done for them by municipal authorities.

Interest in possible automation is greatest in the libraries at the larger end of the group. The smaller libraries range from minor concern to virtually no interest at all. At the same time, some state or demonstrate that they have little information about potential library applications of automation on which to formulate an opinion. One smaller library was offered the possibility of using a municipal computer installation to support library applications, but talks have not resulted in any firm plans. The use by these libraries of municipal computers is rendered a little more problematical, because a number of the municipalities are likely to be changing or upgrading their installations in the near future. In addition, in one or two cases, either the library or the municipal computer location is also subject to change. It is worth noting that in the two instances where municipalities are on the verge of installing either a first computer or an upgrade, there appears to have been no consultation with the library as to its requirements.

None of the libraries expressed very great interest in automation of serials, although one did state a moderate level. Circulation and cataloguing each attracted the greatest interest, with circulation having a small majority who would prefer to automate this function first. Following close to these two, automated acquisitions generated interest. Inter library loan was mentioned in a small number of cases. Connection between this library activity and automated support services was not indicated by the respondents. One inference may be that such a link is not clearly established in this audience. It appeared that the emphasis for automation would be on the improvement of in library services and functions. One would have to speculate what this may imply for the libraries' commitment to external resource sharing.

General comments

These eight libraries fall into three groups. Banff, Canmore, Grande Prairie and Fort McMurray are each fairly isolated from any larger system, although Grande Prairie is located in the same area as the community college. Lethbridge and Medicine Hat are each large enough that an independent automation project can be contemplated. In addition, each is close to a community college with which a joint development might take place. Airdrie and Fort Saskatchewan are both close enough to major centres, that shared development can reasonably be considered.

In contrast to the regional libraries, and with the exception of the largest member, the group does not appear to have any urgently pressing need which would best be addressed by the implementation of automated systems. The immediate implication of this fact is that any plans for automation in these libraries, other than the installation of very small applications packages, could be done more deliberately and with attention to wider regional developments, rather than simply to local needs and concerns. Most of the libraries expressed the strongest concerns about costs, rather than about improved services. In some, if not in all, the step to thinking seriously about automation has not yet been taken.

COLLEGE LIBRARIES

Introduction.

The inclusion of the Alberta college libraries in the study was intended to address two objectives. In the first place, it was felt that some data relating to a different type of library would provide useful comparisons, especially with regard to cost of various activities. This was felt to be the more desirable, inasmuch as the college libraries have between them automated a number of library functions, and could therefore provide at least some cost comparisons between manual and computer based systems. Secondly, the Alberta Public Library Directors' Council desired the study to be applicable to as wide a group of libraries as possible. One factor behind this objective was the possibility of shared automated projects, which might include both public and academic libraries. Accordingly, the eight college libraries were invited to participate. All but two did complete and return the study instrumentation.

The accuracy and completeness of the information obtained from the college libraries is subject to the same caveats expressed with regard to the public libraries. In some cases information was not provided. In other cases, estimates were provided. In general, much the same kind of omissions were observed.

General description

The college libraries of the province fall into two groups. One group, composed of Red Deer, Grande Prairie, Grant McEwan, Lethbridge, Mount Royal and Medicine Hat are perhaps more broadly based in their curricula. NAIT and SAIT are more technically oriented. Representatives of both groups are included in the study. All of the eight colleges are located in reasonable proximity to one or more of the target public libraries. Population comparisons, such as were used for the public libraries, are less valid for college libraries. In terms of student numbers, the largest has a clientele of some 15,000 regular students. The remainder range from 1000 to 4200. All of the college libraries serve community users. Library operating budgets range from some $200,000 to $1,000,000, and collection sizes range on either side of 50,000.

Circulation procedures

Of the six colleges responding, four are using manual circulation procedures. One uses a locally developed system which runs on the college DEC VAX 11/780. A second has just mounted a modified ULISYS system, running on the college DEC 20. This latter has the second largest of the reported annual circulations, running at 83,000. A third is planning to mount ULISYS in the near future. The annual circulation volume of the remaining manually operating libraries ranges from some 18,000 to nearly 50,000. One college is by far the largest in these terms, with an annual circulation of over 200,000. This library, however, uses 14 FTE staff in the circulation function. One college is planning to mount in house developed software on the college's VAX computer, to handle overdue functions, as a preliminary to implementation of a micro based circulation system in two years' time.

As is to be expected, circulation volume in the college libraries is substantially less than for many of the public libraries. Only one college provided information from which costs per transaction could be calculated, and in this instance, the relevant figure was $1.49.

Cataloguing procedures

All but one of the libraries catalogue their acquisitions manually. One has very recently begun to use the UTLAS system. Not all of the libraries provided information on cataloguing volume. For those which did, the annual figures lie between four thousand and seventy five hundred, with a high percentage of single titles. Some of the colleges have substantial backlogs. Costs appeared somewhat higher than typical costs in the public libraries, but there was a considerable disparity between the colleges, as there was also in the productivity per FTE.

Acquisitions procedures

a. Monographs

Four of the six are operating manually. One uses a locally developed system, running on a DEC VAX 11/780. A second also has an in house system running on MAI Basic 4. Number of titles purchased ranged from 1500 to over 6000. As was the case with cataloguing costs, there was considerable variation in the costs per FTE of this function.

b. Serials

All six of the libraries reported that they control serials manually. The serials collections ranged from the 400's up to 1000, a level generally higher than most of the public libaries, as was the number of standing orders controlled. Again, this pattern is characteristic of academic libraries.

Inter library loan

None of the college libraries is a net lender. Levels of inter library borrowing are comparable to those in the smaller public libraries, in the range of a few hundred annually, and all below 500. There was evidence of some co-operation between local colleges and public libraries, in at least one instance including a joint union catalogue, that may provide for various kinds of loan, which are not reflected in official inter library loan statistics. The colleges turn primarily to the universities as their sources for inter library loan.

Attitudes to automation

More of the colleges have implemented one or another automated function than is the case in the public libraries. This presumably reflects their access to college computing facilities, although it must be remembered that the public libraries also have access to municipal computing equipment in many cases. All of the college libraries expressed interest in future development of computer based systems. At least one has implemented a locally developed system. In general there appeared to be a greater degree of familiarity with automated systems in the college libraries. In no case did a college suggest the possibility of a shared development with public libraries.

General comments

The college libraries as a group are farther advanced on the road to automation than are the public libraries, but not by much. There appears to be no particular pattern to their sequence of implementation. Both cataloguing, acquisitions and circulation are represented. In house software, bibliographic utilities and turnkey systems are all used. All run on shared facilities in the college as a whole.

For the public libraries, the geographic location of the colleges warrants a review of potential shared developments with them, particularly in those libraries which are more remote from Edmonton or Calgary. The automated packages installed to date in the colleges are not really amenable to sharing with the public libraries, not so much because of software limitations, but because they are already running on shared hardware. However, few of the college libraries have become automated to such an extent that future joint development could not at least be considered.

COMPARATIVE LIBRARIES IN BRITISH COLUMBIA

Three libraries were studied in British Columbia. Several reasons warranted the choice of these libraries. First, the province itself is located in the West and bears a number of resemblances to Alberta, in the present pattern and historical development of its library system. Like Alberta, British Columbia has many widely separated small libraries, two large municipal conurbations, a number of regional systems, and a network of community colleges. And again as in Alberta, the provincial government funds, and takes considerable interest in the development of the provincial library system. Both provinces have experienced major network studies in recent years.

The three libraries selected comprise one regional library, which has automated one of the turnkey systems selected for review in one of the accompanying studies; and two municipal libraries, which use a mix of manual and automated systems. The automated systems are different in each case, both as to vendor and function. These two libraries are both more comparable to the Alberta public libraries at the higher end of the population scale. They were selected deliberately, because generally, smaller libraries are unable to provide as much detailed information as is desirable to permit a full comparison.

The three libraries have populations of 60,000, 95,000 and 492,000 in the regional library. Operating budgets for the three, 1982, were $1.1 million, $1.76 million and over $4.5 million respectively. Annual circulation figures were 530,000, 785,000 and over 4,000,000 for the three.

The smaller of the three uses a Recordak circulation system. The regional library uses a manual system, but is contemplating introduction of a computer based system for its larger branches. The third library is about to implement a CLSI circulation system. It was assisted in this development by the provision of nearly $150,000 from the province, under the Provincial Computerization of Libraries Fund. This fund was established some years ago, with a capitalization of $3,000,000, and has been used to assist several library automated projects.

The regional system is characteristic and comparable to the Alberta regionals in its approach to automation. Its initial venture was the implementation of the EasyData cataloguing system, whose objective was primarily to provide union catalogues throughout the system. Acquisitions has also been mounted on this system. One of the public libraries uses UTLAS. This library is using an interface with CLSI which it is in process of mounting for circulation, and hopes to implement dial up access to the Vancouver CLSI installation to obtain location and holdings information for inter library loan. It also plans to use CLSI acquisitions and public access modules within the next two years. The third uses the Dartmouth package in its cataloguing, producing a book catalogue with its aid.

One of the libraries is a member of the Greater Vancouver Library Federation, and participates in its inter library loan agreement. The other two are not members of this consortium.

The regional library has been using automated systems for nearly fifteen years. The two municipal systems have both implemented such packages within the past five or six years. Developments in these libraries have occurred in the midst of intensive province wide discussion of various shared possibilities, including the establishment of BCUC, and the concomitant semi co-operative UTLAS venture. Nonetheless, each of them has made the progress it has working largely independently, and this in close proximity to the third largest population concentration in Canada, with a wealth of public, academic, governmental and special libraries.

These three libraries are somewhat more advanced in the automation of their activities than are the target public libraries in Alberta. For this reason, to the extent that valid data could be obtained, both for the manual and the automated components of their activities, Alberta libraries may be able to see a little way ahead into one possible future.

COSTS IN THE LIBRARIES STUDIED

The supplementary tables contain analyses of staff costs per transaction, and related statistical information for the libraries studied, arranged according to functional area. It should be noted that these are indeed staff costs, and in some instances there will be additional expenses for suupplies, and other ancillary matters. However, in as much as staff costs do constitute the great proportion of library costs, they are here presented. One significant exception to this lies in the area of costs of purchased catalogue copy, which may be an important component of the total cataloguing costs for some libraries. Figures on purchases of catalogue cards by the target libraries are presented in Table V. The following sections extract some of the data from the tables.

Circulation

Because of the complications introduced by the nature of the regional systems, they were not included in these analyses. In this functional area, there was a wide variation in the number of transactions per full time equivalent employee. In the remaining group of Alberta libraries the number ranged from 4950 to 139943 with a mean of 47,597. However, this average was pulled down by inclusion of the college libraries. For Alberta public libraries alone, the volume ranged from 24,519 to 139,943, with a mean of 61,161. In the colleges the mean was 13,711, and in the B.C. libraries it was 34,402.

The cost per transaction in all Alberta libraries studied, ranged between $0.18 and $1.49, with a mean value of $0.63. In the public libraries alone, the mean value was $0.36, compared with $1.32 in the colleges. The comparable mean value in B.C. was $0.48.

The percentage of total staff budgets devoted to circulation staff also varied across the groups. The Alberta colleges were lowest, with 16.16%. The B.C. average was 34.59%. Alberta public libraries were in between, with 22.9%. With regard to the number of FTE staff, the Alberta public libraries devoted an average of 27.92% of the total to circulation work. In the colleges the average figure was 36.69, while in B.C. the figure for one library was 65.4%.

Acquisitions (monographs)

In this category, five comparisons were made. The first was of the cost per title acquired. Here the college costs were notably higher, with an average figure of $6.50. The figure for public libraries was $2.70. Only one B.C. library gave information from which a figure could be calculated, and it was $1.27.

The discrepancy was also found, but in less marked fashion, in the costs per item. Here the college average was $4.55, while for public libraries it was $2.36. The B.C. figure was $2.10. It was accordingly no surprise to observe that the titles acquired per FTE staff were considerably higher in the public libraries than in the colleges. The figures were 11,346 and 5,269 respectively. In B.C., however, the figure for the one library providing the necessary data, was lower again, at 3333. The percentage of total staff budget devoted to staff in this function, and the percentage of total staff FTE were similar for both colleges and public libraries. The B.C. library was considerably below.

Acquisitions (serials)

Analysis of the data in this function showed the process of acquiring serials to be relatively a very costly one in each group of libraries. The reported cost per title in the public libraries ranged from $1.19 to $44.92, with a mean value of $15.14. In the colleges, the range was from $12.94 to $55.25, with a mean of $28.36. The highest mean was in British Columbia, at $30.61, though the range extended only from $23.10 to $48.11.

The Alberta public libraries appeared to be considerably more efficient in this activity, acquiring an average of 258 titles per 1/10th FTE. The corresponding figures in the colleges and in British Columbia were 95 and 63. Percentages of total staff budgets and total staff FTE's were not very different in the three groups, with the colleges being highest in each instance, at 4.39% and 5.96%. The Alberta public libraries were the lowest in each category, at 1.79% and 1.22%.

Cataloguing and Processing

Six comparisons were made for this function. In the two cost comparisons, Alberta public libraries had the lowest figures. In two productivity measures they scored the highest. In percentage allocations of staff budgets and staff FTE, they were in the middle.

The average cost per title for Alberta public libraries was $6.22, and for cost per item it was $5.46. This compared with $9.80 and $7.84 respectively for the colleges, and $18.65 and $9.98 for a B.C. library.

Average figures for titles per FTE and items per FTE in the public libraries were 3,943 and 5,820. In the colleges the figures were 3,096 and 3,879, while in the B.C. library they were 1,986 and 4,388.

The budget and staff percentages in the public libraries were 11.02% and 12.46%. For colleges they were 12.21 and 16.68%. The B.C. figures were 8.04 and 4.1%

Inter Library Loan

In the cost and productivity measures, the public libraries were in the middle range. Cost per item was $8.96 and items per FTE were 3,629. The comparable figures for colleges were $15.35 and 1,014. In B.C. the averages were $5.13 and 4,454.

Percentage of total staff budget and total staff FTE for the public libraries were 3.54% and 4.44%. For the colleges they were 0.74% and 1.54%, while for a B.C. library the respective figures were 0.57 and 0.2%. It should be noted that the B.C. figures did not include any NET participants.

POTENTIAL IMPROVEMENTS TO EXISTING MANUAL SYSTEMS

The libraries surveyed fall into three groups, each of which must be considered separately when reviewing possible improvements to their existing systems. The first group consists of the multi branch shared systems. The second includes the larger members of the group. The third comprises the small member libraries. However, for all alike, the same preliminary question must be addressed - how is an improvement to be defined, or recognized when it is implemented? Libraries, like other organizations, do well to remember the immortal words, "if it ain't broke, don't fix it." A second, and related question is the goal of any improvement. Is it to save money, or is it to improve service?

The suggestions which are put forward in the following sections attempt to address the circumstances of each of the three groups referred to, and to propose a number of improvements which might provide better service, save money, or perhaps do both. Whether any particular change will do either of these things, or is appropriate in a given library, must be addressed in the local context.

A library which wishes to determine the cost benefit of a particular automation project would naturallly be well advised to examine its existing manual procedures, in order to be able to decide whether or not the machine system would be an improvement, or whether the existing system could be upgraded. However such an internal review, at periodic intervals, is well worth its time, even in libraries which have no particular intention of automating. Over the years systems alter and change, habits grow, once appropriate circumstances change, so that improvement is often possible. This is true of library specific functions, and of more general tasks which happen to be carried out in the library. The following sections review different library functions, as well as the office component of library work.

Some concluding comments in the section address the question of how to determine the costs of improving manual services.

Circulation

In a manual system no major problem arises until the volume of circulation grows large. One figure sometimes used is 100,000 transactions per year from a single outlet. However, this can be affected by the number of associated transactions, such as requests and overdues, and also by whether the particular system used requires much work on check in. A number of the target libraries have not yet reached the stage at which a problem has arisen. The questions libraries need to ask in this connection are these:

What is the cost per transaction, and how does this compare with other libraries?

How many staff are being used in the circulation function compared with other functions?

How many staff are being used in circulation over all?

Are there lineups at the circulation desk?

Is the amount of card sorting and filing excessive?

Does the system in use permit easy request and overdues work?

The answers to these questions may cause some libraries to consider changes. They could involve the adoption of another type of manual system, or perhaps the installation of a Recordak system, or of a charging machine. A Recordak costs in the area of $3,200 for the basic equipment. A reader printer for production of notices would add another $3,500. Operating costs are low. Another microform system is Brodart's Brodac.

Various alternative manual systems exist, whose different characteristics address different circumstances. Reverse Brown, for example, has advantages over Standard Brown, permitting easier filing and check in, as well as relatively speedy file search by author or class number. Other possibilities include the Newark system, marketed by several companies, Brodart's Sysdac system and the McBee Key-Sort System. Some of the manual alternatives which were at one time common have now fallen into obscurity, but may be worth re-investigation by small libraries.

Another improvement that libraries might wish to consider is the adoption, at least locally, of standardized policies and procedures. Such a move would not be aimed at the existing workload in circulation, but toward the facilitation of future resource sharing, whether by reciprocal borrowing, inter library loan or special co-operative projects such as block book sharing.

A third, rather ubiquitous recommendation, is that libraries should carefully review the type and accuracy of the statistics they keep, since this is important to valid cost benefit analyses.

Acquisitions (monographs)

Of the various activities reviewed, this was probably the one in which it was most difficult to gain an accurate impression of the workload. Yet this is the area in which libraries spend the great bulk of their discretionary budget. This is the area in which constant monitoring of the effectiveness of comparative prices of vendors is most important.

One important rule is to ensure that there is no duplication of work as between acquisitions and cataloguing. Some examples of this duplication might be in the searching process to determine whether an item is already in the collection or in the process of verification or search for bibliographic copy. All processes in acquisitions and cataloguing should be examined to eliminate duplication.

Selection of vendors is another extremely important task. This is because it has a direct effect on money expended. Many libraries entrust virtually the entirety of their purchases to one or two vendors, sometimes without review over several years. This is to ignore the fact that vendors offer different combinations of service, and also that level of service can change over the years. Some of the factors of service are speed, discounts, billing arrangements, availability and extent of cataloguing, processing and ancillary services, areas of special expertise, such as in Canadiana, paperbacks, audio visual materials, children's books, etc. Making judgements on vendors requires a detailed analysis of their performance history. This is often difficult to do in a manual environment, but ought to be done nevertheless. Another useful practice is the sample order, repeated among different vendors, every few years. A vendor's price package should never be accepted as is. A library should always attempt to obtain the best possible combination of price and service.

There may be many reasons why a library prefers one vendor for a particular type of order. Perhaps it wishes to support the Canadian book industry. It may wish to avoid the trouble of dealing with customs brokers, different shippers etc. Therefore a review of acquisitions procedures might include a statement of the library's objectives in this area.

The acquisitions/cataloguing/processing complex is also one in which libraries could often benefit from the application of time and motion studies, forms analysis and flow charting. An effective work flow for paper and materials can do much to speed the process, improve productivity, and ensure adequate control and security. It must not be forgotten that this area is also one from which materials sometimes "walk."

We make the following specific suggestions:

1. Use modern forms technology, to ensure that information is never typed more than once.

2. Use multiple copy book order forms - one for each item ordered - rather than lists. This form should then be used for as many necessary functions as possible.

3. Consider the provision of a copy of the order for filing in the card catalogue.

4. Consider the provision of a copy of the order for funds control

5. Use one copy of the form to order cataloguing copy.

6. Keep the number of separate order files as few as possible.

7. Ensure that all files are self purging.
8. Consider the implementation of blanket orders, in specified fields.

9. Review the statistics kept, and keep in mind that the numbers searched, ordered and received may all be different, and that titles and items give different counts.

10. Establish standing orders wherever possible.

11. Consider lease plans for materials of passing interest.

12. Arrange with vendors to keep copies of orders in machine readable format, for future retrospective conversion.

13. Finally, the co-ordination of acquisitions in the region may allow libraries to obtain improved discounts and better service. In addition joint collection development can allow more effective use of limited acquisitions budgets.

Acquisitions (serials)

Many of the considerations noted above apply here too. Reviewing the cost per title managed indicates that serials acquisitions is a costly business, and therefore the benefit returned from a review of procedures here may be relatively large. Again as far as possible, duplication of typing and record keeping should be avoided. Very often it will pay to use a good subscription agent. It is worth noting, however, that such agents are beginning to increase the imposition of service charges. Even so, it may be cheaper than to carry out the procedures in library. Multiple year subscriptions sometimes carry extra discounts, if auditors permit. On the other hand, libraries which carry funds over from year to year may lose the interest return.

Serials work should as far as possible be batched. This has two advantages. The first is that the work is done more efficiently when a staff member can spend an allotted portion of time, uninterruptedly, whether to do orders, claims or check in. The second reason is that batching makes the task of analysing the time spent, and consequent cost analyses more feasible.

There is a variety of tasks to be performed in serials management, and they are all ongoing for every title. In this respect the function is dissimilar to monographs acquisitions. These tasks include order placement, invoice receipt and payment, check in, claims, binding, discard, microform replacement and others. The work can be expedited and facilitated if a standard and unified record format is used.

Cataloguing

Eight areas of cataloguing need to be addressed. They are the search for cataloguing copy, the alteration of and addition to the copy to match the item in hand, the production of the physical catalogue (usually in card format), the integration of the record with the existing catalogue, the establishment of the reference network in the catalogue, the maintenance of the catalogue and the general clerical activities associated with each of these tasks. The final area is the cost and service component of purchased catalogue copy.

Most of these possibilities for improvement must be considered in the light of the library's objectives. If it does not consider that complete consistency and adherence to external standards is of great moment, improvement of the reference network in the catalogue, for example, will be of low priority, and the costs of doing it will be an important consideration. Equally, a library faced with the absolute necessity to reduce costs might consider reducing the quality of the catalogue, rather than closing one day a week, for example. In almost no other area of the library do cost and service considerations so almost perfectly balance one another. These questions become particularly important in shared environments, whether automated or not. In such a case, the catalogue is the library's arm out, its service agent, and its compatibility with the shared system at large will importantly affect the contribution it is able to make. Decisions made in the independent environment may have serious repercussions in a shared future.

Some specific possibilities, most, but not all aimed at improving service rather than lowering costs, are these:

The search for cataloguing copy

1. Ensure that the search does not duplicate work done in acquisitions.

2. Subscribe to MARC fiche, and search in house. Cost $200/year.

3. Share MARC fiche with the acquisitions process.

4. Purchase copy from an external source, rather than produce it in house.

5. Ensure that purchased copy comes from the cheapest possible source, when all factors are considered.

Alteration of and addition to the copy to match the item in hand

1. Don't do it! The pursuit of perfection, in a small library at least, may not be necessary.

2. Alter copy only selectively, where exactitude is important.
   a. Selectively in areas of the collection
   b. Selectively in portions of the catalogue record

3. Do not add to CIP data.

4. Ensure that ISBN, LCCN and any other appropriate numerical search keys are added to the record.

5. Consider listing numerical search keys on magnetic tape or micro diskette, for use in later retrospective conversion.

Production of the physical catalogue (usually in card format)

1. Ensure that any card production in house uses the most efficient technology - at least a memory typewriter.

2. Consider the possibility of photocopying from MARC fiche rather than typing cards. It's usually cheaper.

3. Don't be overly fussy with details of format on the card, spacing, coloured inks, etc. The catalogue is not a work of art.

4. Use unit cards.

5. If for some reason, unit cards are not used, do not include full information on every card, only on the main entry.

Integration of the record with the existing catalogue

1. Determine whether this is an important library priority or not.

2. Consider the use of tick tracings.

3. Maintain authorities files.

Establishment of the reference network in the catalogue

1. Consider not using a reference network. It may not be needed by your borrowers.

2. Don't keep the reference network in the catalogue at all. Mark up the LC List of Headings, Sears Headings, and have Name Authority Publications available for patron use.

3. Don't do any work in this area prior to card filing. Then do it by exception. Check reference only for first entry of the name or subject heading. (Tick tracings help here).

Maintenance of the catalogue

1. Do maintenance regularly. An unmaintained card catalogue becomes unwieldy, ultimately unusable, costly and space wasteful.

2. In conjunction with a regular program of catalogue maintenance, begin adding numerical search keys to older records. This will help in future retrospective conversion projects.

General clerical activities

As has been noted above, many of the advantages of modern and particularly of automated techniques may be used to good effect in the cataloguing department. Word processors, in particular have a number of potential uses, from producing the card itself, to sending the record on line to some computer installation, to acting as a computer installation in itself, for various functions.

Other devices and techniques should be used to the full. Photocopiers, dictaphones (consider using a dictaphone in conjunction with the copy search process, for example), memory typewriters, batching of tasks, especially of on line searching for copy, if this is done, and flow charting procedures are all examples of potential sources of improvement. Another useful technique is to maintain and review productivity records. One library studied, for example, has an understanding with the library staff union that no book should take more than twelve minutes to catalogue.

The purpose of this is not so much to put staff under an undesirable gun, although of course, it does allow comparison with standards. The real purpose is to identify bottlenecks, and other problem areas, and particularly busy times of the year. Identification of such factors enables remedial measures to be taken which will improve productivity.

In general use staff at the lowest possible salary level for as many tasks as possible, consistent with quality.

The cost and service component of purchased catalogue copy

1. Review and compare vendor prices and service claims. Carry out performance tests, do batch experiments and maintain service records.

Finally, as is the case in circulation, the co-ordination of standards with neighbouring libraries will make future co-operation easier.

Collections Management

The review of this somewhat neglected area can pay off in improved service, and more effective utilization of limited acquisitions funds. The basic requirement is the keeping of accurate and detailed records, so that use of the collection can be documented, weak areas identified and strengthened, and a planned acquisitions program, rather than idiosyncratic selection be introduced.

Such a program is valuable in the individual library. If libraries can work co-operatively in collections development, their purchasing power and provision of service can be multiplied.

Inter Library Loan

The four components of any inter library loan operation are location of holdings, transmission of the borrowing request, the delivery service, and advertisement of the service.

Improvement in knowledge of holdings and locations can be done in various ways. The traditional one has been to maintain a union card catalogue at some central point. This is still done and can work. It is costly of staff time, but whether this is a disadvantage depends on the priority given to this service. Another, more limited way to achieve the same end, is for nearby libraries to exchange shelf list cards. This has still some staff cost implications, but they are less onerous. Such exchange could take place in limited subject areas.

Transmission of the borrowing request is well done in Alberta. Telex is used and the Envoy 100 electronic mail service which speedy message request to many potential sources is being tested in a pilot project.

Little improvement in delivery seems possible at this time. The development of facsimile transmission may provide a useful alternative in the future. Inter library loan is presently promoted as an adjunct to the reference service in many libraries, rather than as a supplement to the circulation service. Experience in other jurisdictions indicates that with some promotion, the demand for ILL can grow substantially. With it, the costs grow, and therefore such a potential improvement demands some discussion of the provincial objectives in providing inter library loan.

Management Information Systems

This topic refers to the use of planned programs of records keeping, in conjunction with periodic systems reviews, cost, productivity and other analyses, to determine how effectively and how efficiently a given task is being performed, as well as to identify weaknesses in the system, prepare development, personnel and budget plans, and deploy various resources as expeditiously as possible.

Even in a manual mode, much can be done to this end. Many of the specific suggestions made in other sections bear on this topic also. Management information requires a systematic, logical and planned approach to administration.

General Office Procedures

Improvements in manual systems are not necessarily confined to library specific functions. It is often overlooked that one of the largest areas of work in many libraries is not the circulation department, or the cataloguing unit, but the general office. Even in small libraries, significant amounts of office work must often be done. One of the greatest shortcomings of many libraries is the inadequate standard of general office procedures. This is true of many very large libraries, as well as of small. Indeed, we would go so far as to say that, while libraries have generally been in the forefront of change as far as specialized automation projects are concerned, they lag very badly indeed when it comes to office efficiency. Libraries often do not have proper filing systems. Dictaphones, typewriters, memory typewriters, modern telephone and paging systems, flow charted procedures, effective planning and review systems and budget control processes are often lacking. Modern office technology, including word processors, electronic messaging, facsimile transmission, fast printing, etc., is the exception rather than the rule.

While the target libraries are unlikely to jump with both feet into the "office of tomorrow" immediately, there is much to commend their investigation of some of these aids. The expenditure of a little time, and investment of not very much money could result in a long term saving.

Costing improvements to manual systems

The suggestions made above must all be reviewed in the light of the individual library's objectives and circumstances. Improvement of manual systems can sometimes mean doing a task better but at a higher cost. Sometimes it may mean doing the same thing more cheaply. Alas, it may even mean doing something a little less well in order to save money. Thus the question of costing improvements is complicated by which of these three alternatives is held in mind.

Evaluation of a possible change in a manual system requires the identification of two facts. First does it provide a better service? Second, what are its cost implications? These will nearly always be in terms of staff time. Occasionally a materials or supplies component will be involved.

The determination of service improvement must be the province of the library and its librarians. We do not address that issue here. Costing of the change, however, is an objective matter, and requires identification of all activities involved, together with productivity levels.

The cost benefit analysis model, included as Appendix I to this study, although designed primarily for the evaluation of automated systems, can also be utilized in the review of manual systems, both existing and proposed. We recommend that libraries wishing to examine their systems, and identify desirable improvements, should use this technique to make appropriate comparisons.

COSTS OF SUBSTITUTING AUTOMATED SYSTEMS

The full costs of substituting automated systems for existing ones are determined by taking the difference between the cost of present operations, and those of the proposed new system. This difference should not be taken on the basis of a single year's costs. Implementation of an automated system involves start up costs and fluctuating operating costs for several years. Consequently a more realistic approach is to cost each method over a five year period. The result may be negative or positive, a cost or a benefit. Appendix I presents a cost benefit analysis model which will allow this kind of comparison to be made.

In this process, it is essential that no cost components of the implementation of a new system be overlooked. Study No. 4 which reviews mini computer based systems for library automation, provides a very detailed review of all the cost components of automation. That discussion is recapitulated here in condensed form.

The cost elements to be included are as follows:

Planning Costs

Systems analysis
Cost analyses
Preparation of Request for Information
Preparation of Request for Proposals
Preparation of Request for Bids
Staff orientation and development
System requirements review
Site requirements review
Consulting fees

System Costs

1. Hardware

Central site equipment (if in a shared development)
Local equipment (these first two items may be identical in a standalone installation)

CPU
Terminals
Disk drives
Tape drives
Printers
Communications equipment. e.g. interfaces, modems
Miscellaneous ancillary equipment. e.g. light pens, laser scanners, cables, etc.
Back up units. e.g. additional CPU's, stand alone terminals, micro computers

2. Software - sometimes included with hardware costs

N.B. Precise hardware and software costs can only be determined in consultation with the vendor, because the exact requirements must be determined by the library's specific needs, in all but very small installations.

Implementation Costs

- Installation
  - Personnel
  - Travel
  - Services
- System modification
- Site preparation
  - Power requirements
  - Air conditioning, humidity and dust control
  - Fire requirements
  - Security
  - Space modification
- Staff training
- Staff time for conversion to new system
- Shipping, insurance
- Contingency reserve

Retrospective Conversion Costs

- Change record format and content
- Load records
- In house staff costs
- Commercial services

Operating Costs

- Communications - fixed line costs/usage charges
- Software maintenance
- Hardware maintenance
- User group membership
- Staff costs
- System updates
- Shipping, insurance
- Supplies
- Data loading
- Service costs

The foregoing inventory of components does not pretend to itemize every conceivable element which may bear a cost in the process of automating. Many details depend on the function being automated, the system chosen, whether it is a stand alone or shared development and the library's own requirements. However, it does provide a comprehensive set of categories which will allow any library to set out a preparation sheet to ensure that nothing is inadvertently overlooked. Although it is not specifically listed as a cost component, it should not be forgotten that the implementation of an automated system may well take two or three years. During that time, the energies of many staff will be at least partly occupied in preparation. These real impacts must be kept in mind.

The range of potential costs for an automated system is very wide. To implement a small micro based single function system, in a small library might cost no more than $10 to $20,000. An integrated mini based system in a single library could easily cost $250,000. Costs for a multi library system might be much more. Typical system costs are more fully detailed in Study No. 3 and Study No. 4, which deal with micro and mini based systems respectively.

The costs of computer systems are changing rapidly, as the technology changes. For this reason, even the experience of other libraries is not always a reliable guide to the actual costs another library would incur as little as a year later. A contribution to the elimination of unnecessary costs is always the utilization of qualified expertise, whether by hiring permanent staff, or by using contract services.

Finally, the uncostable elements of computer based systems should be given due consideration. Improved or additional services even at somewhat higher costs, may be felt to warrant such change.

COST BENEFIT CONSIDERATIONS

A formal cost benefit analysis is only one component of the decision making process which a library should undertake when considering implementation of an automated system. It is not easy to do, but it is worth doing, whatever the result, for it entails a systematic examination and appraisal of a library's functioning. If well done, it will entail the same scrutiny of the library's objectives. These two tasks in themselves can hardly fail to be advantageous.

The term cost benefit itself may be thought of as having two components - cost efficiency and cost effectiveness. The former concerns how well a given task is accomplished. The second concerns how well what is done, efficient though it be, answers to the task that ought to be done. A cataloguing department may be wonderfully efficient in putting books through at a rapid rate, and low cost. If the resultant catalogue is inappropriate to the needs of the users, then the department is not cost effective.

The first task in a comparative cost benefit analysis is to establish what is desired to be done, detailed within broad categories. Secondly, activities carried out in support of these objectives must be quantified as far as possible. Thirdly, present methods have to be costed. Fourthly, proposed alternatives must be costed. However this step brings in the complication, when applied to automation, that almost certainly the new system will provide the ability to do things that are not now being done. There has to be a process that relates the costing of these to a realistic appraisal and quantified summary of the benefits expected to be gained from them. Lastly, the costs of the present and proposed new systems must be compared, and a calculation made as to the period of time required for the capital costs of the new system to be amortized by any operational savings or quantified benefits.

When this process has been carried out, and detailed costings established for alternative methods of functioning, it does not necessarily follow that the cheapest should be selected. A library must turn back to its objectives for guidance. More often than not it may be found that several ways of doing things are not very different in cost, but that they confer somewhat different service benefits. Cost benefit analysis must then be supplemented by qualitative analysis. Part of such a qualitative analysis ought to include evaluation of relations with other libraries and potential future co-operative developments.

Final cost calculations are more complicated, since assumptions must be made about rates of inflation and effects on interest rates and salaries over several years. It is best to do the calculation for several different inflationary assumptions. For an automated system, because of the rate of development of computer equipment, it is not advisable to assume an amortization period much more than five years.

The following sections provide some discussion of advantages and disadvantages, as many as possible of which should be considered for quantification, and of the elements of cost efficiency and cost effectiveness, before outlining a model for a cost benefit analysis itself.

Advantages

Over the past twenty years, the driving force behind automation in libraries as in many other areas, has been the steadily increasing labour component of work, and the even faster rising cost of staff services. Library work has always been very labour intensive. Automation is very capital intensive, and requires a lower labour component. Many of the advantages that can be attributed to computer based systems flow from these facts. However, such systems can provide other benefits than staff savings alone. The following tabulation lists the major areas in which a library might observe benefits from automation.

Functional personnel cost reduction

Administrative personnel cost reduction

    Data capture/Management information

Reduced error correction

Reduced forms production

Reduced staff growth

Greater productivity

Reduced Operating Costs

Better equipment utilization

Capital value of equipment

Reduced data gathering costs

Increased revenue and revenue productivity

Reduced printing/duplication costs

Space savings

Reduced communications costs

Reduced transportation costs

Reduced supplies

Better collections development and management

Disadvantages

Many of the points listed above could also be considered as a disadvantage, if implementation of the system should result in an increase in the staff level or operating cost of an activity or service. Again, an increase in costs must always be measured against the value of increased or improved services.

Some librarians consider that computers bring with them a remoteness and impersonality in the library which is antithetical to the library's humanistic origins and objectives. Further, that it comes between the user and the librarian to the detriment of service. The reality of this disadvantage will depend on the orientation of the individual library, but should not be dismissed lightly, especially perhaps, in smaller libraries. It is certainly the case that implementation of computer systems may seriously affect staff morale, if the project is not carefully planned, with staff participation, and carefully managed during the initiation phase. However carefully planned and well managed, it is also a fact that the implementation of any new system has the potential to dominate the life of the library for the period of the project, which may last for several years. Again this can impact other services undesirably.

A more fleeting disadvantage may occur during the process of automating. Implementing a new computer based system in the library is fraught with potential for errors, misunderstandings, oversights and surprises. This is especially distressing in shared enterprises. Many libraries have horror stories to tell about their experiences. However, it can be expected that these difficulties will largely be overcome after the first six to twelve months.

General comments

For each function to be automated, every individual component activity of the present system must be identified and costed. Potential new activities must be given priorities. Each component activity of the proposed new system must be identified and costed. In each case, both direct and indirect or derived advantages and disadvantages should be identified. In a shared environment in particular, care should be taken that a realistic assessment is made.

Cost efficiency

Of the two components of cost benefit analysis, this is the one that is easier, in one respect, to carry out. Cost analyses deal with quantifiable factors, and though the formulae involved may seem complex, persistence can conquer them. A first step, for libraries unused to such analyses might be to attempt the construction of a program budget.

Establishing cost efficiency requires first the precise definition of the function under review. This definition may be broad or narrow. An example of a broad category might be the acquisitions function. Another more restricted example might be serials check in. The second step is to inventory all the activities and other components of the function. This should include identification of each cost centre to which charges may be assigned. Thirdly, and just as important, some measure of the functional output must be established. This could be number of items purchased, number of materials circulated, or checked in, etc. In a function like circulation or acquisitions, outputs may be easily quantified. In others, such as reference work, they may be less precise.

Components not normally charged to a related cost centre should not be overlooked. Administrative overhead - heat, light, maintenance, etc., general supplies, photocopying, fringe benefits, capital expenses, amortization of furniture and equipment etc. Another way of identifying costs is to categorize them into staff and non-staff related expenditures.

Non staff related costs can normally be identified with some accuracy. The critical point here is to ensure that none are overlooked. Establishment of accurate staff costs may require assignment of portions of different staff members' time to different activities, often a difficult task. Time and motion studies, flow charting techniques, maintenance of staff work diaries, and statistical records can be helpful. The end result of this activity will be to determine what a given function is costing the library. Determining cost efficiency for the function then involves comparing the cost with the output, previously identified. Following this, a judgement must be made whether the ratio of the two is within an acceptable range. This may be by comparison with established standards, with actual ranges in comparable libraries, with past history in the library, with objectives previously agreed upon between management and staff, etc.

Cost effectiveness

The other half of cost benefit analysis is the examination of cost effectiveness for a function. In contrast to the previous section, where the emphasis was on quantifiable measures, and in particular on costs, effectiveness, although it does entail a review of costs, is much more concerned with the relative intangibles of service. In effect, one wants to establish whether what is being done, efficient though it may have been demonstrated to be, is addressing the appropriate objectives. Thus, in addition to the definition of function, inventory of activities, and establishment of outputs, and costs thereof, which formed part of the cost efficiency review, it is now necessary to put these three factors in the context of specific objectives.

A simple listing of activities does not necessarily accomplish this, because it places no priorities on different activities, some objectives may be abstract, rather than activities, and some objectives may simply not be attainable in the system. For example, the cost efficiency side, applied to circulation, will determine the cost per transaction. This might well be very low. Cost efficiency is high. However, if all the transactions involve check out and check in, and no requests or overdues are being done, because there is no time left for them, or the particular system does not easily allow for these functions, then cost effectiveness is low.

The establishment of cost effectiveness is a subjective matter. However, it is essential. Cost efficiency alone does not provide full accountability. A library, like any other public agency, can imperceptibly move away from its original objectives. On the other hand, the appropriate objectives may change, and the library fail to respond. Accordingly, review of objectives, and assessment of the degree to which they are being or would in a new system be met, should be a component of any cost analysis. Assessment of performance against objectives follows the assessment of performance in quantifiable terms. The following section describes the model which is included in this report, to facilitate that quantitative review.

THE COST BENEFIT MODEL

In different situations different methods of cost benefit analysis may be appropriate. The outcome of the analysis is always to compare alternative courses of action. There are five available, logical alternatives to which to apply the results of the analysis, each applicable to a given situation. They are:

1. Maximize benefits for a given cost

2. Minimize costs for a given benefit

3. Maximize ratio of benefits over costs

4. Maximize net benefits

5. Maximize rate of return

Any of these alternatives may be appropriate in some circumstance. For example, the first would apply for a library operating under the constraints of a fixed or even a reduced budget. The second would be particularly appropriate for a library proposing to implement an automated system. These are the two which are most appropriate to the target library group. The remaining three are operative in more specialized circumstances.

Whichever of these alternative courses of action may ultimately be decided upon, it is usually preferable to carry out the analysis itself on a constant dollars basis. The model presented in this study is designed to accomplish this. The reason for preferring this alternative is that analysis in constant dollars takes away the necessity to make constant adjustments for inflation. The cost benefit analysis model is presented in full in Appendix I. Its eight parts are listed on the following page.

Cost benefit analysis components

The model explained in Appendix I contains six form layouts, and two guidesheets to explain the use of three of the layouts. The total eight sections are as follows:

1. Multi year costing layout for present system, by function (in constant dollars)

2. Multi year costing layout for new system, by function (in actual, inflated dollars)

3. Multi year costing layout for total new system for all functions (in actual, inflated dollars)

4. Summary comparison layouts, by function

5. Summary comparison layouts, for total present and automated systems

6. Summative layout of total functions for #1

7. Guide sheet for #1

8. Guide sheet for #2

CONDITIONS UNDER WHICH SMALLER LIBRARIES SHOULD CONSIDER AUTOMATION OF SOME OR ALL PROCEDURES

Factors to consider

The first step in deciding whether to automate is to determine what conditions in the library may indicate that it should be considered. There are six major factors which may lead to such a review. They are:

Workload

This is a common reason for automating. As volume grows, probable payback from automation increases. The exact point at which it becomes cost beneficial varies from function to function, and from library to library. Watch for lines forming at the circulation desk; books piling up awaiting discharge; backed up notices; cataloguing backlogs; acquisitions delays and the like.

Cost Efficiency

Whether as a result of the above, or of a periodic review, a cost analysis which reveals poor cost efficiency is prima facie evidence that automated systems ought to be considered, as one alternative for improvement.

Cost Effectiveness

Regardless of the cost efficiency, if it has been determined that the library's objectives are being inadequately met, a computer installation may provide a means of addressing them more effectively. In particular, better administrative and fiscal control, management information systems and collection development may provide an effective rationale.

Implementation of New Services

As societal needs change and develop, a library must also grow. The introduction of union catalogues in regional libraries is considered more urgent now than twenty years ago, for example. Again, as a library grows in size, high quality cataloguing becomes more important. Libraries increasingly wish to distribute catalogues throughout the community. Some new services can only effectively be provided through computer based systems.

Budget Effectiveness

In times of restrained budgets, it becomes crucial to get the most value for the dollar. Although automated system may require a high initial outlay, over time, they may save money.

Participation in Provincial, Regional and Local Sharing

Some co-operative developments, which may be highly beneficial to the individual library, can only be implemented in an automated environment. This may not necessarily involve sharing of equipment, only that the library be able to carry out certain functions in house, in a way that is compatible with, and easily transmissible to other libraries.

One can also identify some criteria which are insufficient reason for automating. Automation should not occur just because other libraries are doing it. Local needs and circumstances should always take precedence. Similarly, computer installations should not be mounted as a result of municipal or other local pressure. Sometimes a municipality is anxious to justify the existence or upgrading of its own computer. This may be an advantage to the library. It should never be a reason. The same comment applies to peer pressure from other libraries. Finally, a computer should not be bought, just because the money is there.

Conditions for Successful Automation

Purchase of an inexpensive system, a single application package, running on a micro, for example, can be done well without the extensive planning required for more capacious systems. Even such small implementations, however, should not be carried out without forethought and some planning, while large projects require extensive preparation. For any computer project, some or all of a number of conditions must be met. There are ten of these, as follows:

1. The existing system must be well understood

2. There must be a definite and adequate planning period

3. There must be definition of objectives for the project

4. There should have been a cost benefit analysis

5. There must be adequate lead and implementation time

6. There must be adequate review of alternatives, to select, if not the best, at least a sufficient system

7. There must be good selection and implementation procedures, including Requests For Information, Requests For Proposal, Requests For Bids and rigorous contract negotiation.

8. There should be good local municipal and Board understanding and support

9. The system selected should be of proven effectiveness with working installations

10. The system selected should be as compatible as possible with other systems in use in libraries or agencies with which the library is likely to co-operate.

As important as these conditions are, the library must consider the environment in which it operates. There are many reasons for libraries to work together, in computerization as in other functions, and the cost of automation has in the past led to many shared projects. Costs are no longer the over arching factor they were, but are still high enough, that a library should consider all its options in moving to automated systems.

Alternative provincial automated development modes

There are seventeen major alternative ways in which libraries may implement automated systems, although there are innumerable sub-variations of each. Each could arise as a result of differing combinations of factors. Examples of nearly all are in existence somewhere or other in North America. The variable factors are these.

Single Library - Multi Library

Municipal computer - In library computer

Micro computer - Mini computer

Member autonomous co-operation - Centrally governed co-operation

Bibliographic utility - Commercial vendor - Independent network

Same type of library - Multi type library

Equal size libraries - Unequal size libraries

The seventeen possible major combinations arising from these factors are:

1. Single library implementation using a municipal computer

2. Single library implementation on in house micro

3. Single library implementation on in house mini

4. Multi library co-operative, with autonomous members, using a bibliographic utility

5. Multi library co-operative, with autonomous members, using a commercial vendor

6. Centrally governed co-operative, with like members of equal size, using a bibliographic utility

7. Centrally governed co-operative, with like members of equal size, using a commercial vendor

8. Centrally governed co-operative, with like members of equal size, using an independent computer installation

9. Centrally governed co-operative, with unlike members of equal size, using a bibliographic utility

10. Centrally governed co-operative, with unlike members of equal size, using a commercial vendor

11. Centrally governed co-operative, with unlike members of equal size, using an independent computer installation

12. Centrally governed co-operative, with like members of unequal size, using a bibliographic utility

13. Centrally governed co-operative, with like members of unequal size, using a commercial vendor

14. Centrally governed co-operative, with like members of unequal size, using an independent computer installation

15. Centrally governed co-operative, with unlike members of unequal size, using a bibliographic utility

16. Centrally governed co-operative, with unlike members of unequal size, using a commercial vendor

17. Centrally governed co-operative, with unlike members of unequal size, using an independent computer installation

General Comments

The above discussion outlines the three aspects of automation decisions which the target libraries should review. They are the circumstances prevailing in the library itself, the basic guidelines for conducting a successful inquiry into the utility of computer systems leading to possible implementation, and the shared or autonomous framework in which the development might be organized.

There are a number of more probable alternatives for the target libraries, among the seventeen listed. The most likely are alternatives 1, 2, 3, 8 and 11. Alternatives 14 and 17 are somewhat less conceivable possibilities, while number 5 might eventuate if a large library acted in the role of vendor.

SUMMARY

This study has reported on four aspects of public libraries in Alberta. Current costs, together with comparative data from other libraries, improved manual systems, costs for automated systems and conditions under which automation might be warranted were all studied. In addition, a cost benefit analysis model was developed for use in the target and other libraries. There was a fairly wide range of costs in all categories. The Alberta public library mean average figures compared well with those of other libraries studied. The libraries differed considerably in their preparation for, knowledge of and need to consider implementation of automated systems. A number of suggestions for improved manual systems were outlined.

The study addressed only indirectly the question of library service. This is the other half of library evaluation, fully as important as the question of cost. There are many questions which individual libraries need to address in advance of potential automation. The following section presents a number of recommendations for the immediate future.

RECOMMENDATIONS

The following recommendations bring together the material contained in all five studies. They are grouped in five categories, and include general recommendations for effective planning and management, as well as more specific recommendations to facilitate automation. **Planning** recommendations are aimed at enabling libraries to take action now which will facilitate future automation projects. **Information** recommendations are intended to suggest ways in which libraries can ensure that independent developments do not result in unco-ordinated growth. The third group is concerned with **Finance**, and ways of ensuring adequate funding exists. A fourth category includes recommendations pertaining to **Management**, with the objective of ensuring that library managers have the tools with which to direct the process effectively. A group of recommendations addresses **Operations** and possible changes which might be accomplished now. Finally, a number of general recommendations are included.

Planning Recommendations

1. Libraries should establish service goals, and detailed functional objectives

Rationale: Effective library service in general, and implementation of change in particular, requires that an ongoing planning process exist, based on known objectives.

2. Libraries should prepare an integrated planning document for development over several years, including service, staff, collections, building, automation and financial components. This document should include preliminary timelines.

Rationale: A planning process should be integrated, rather than consist solely of separate functional or departmental plans, which may overlook the interactions between areas, result in duplication, or overlook alternatives. A five year plan, updated every two years, is recommended, to permit orderly growth and to ensure that adequate fiscal preparation can be made.

3. Libraries should ensure that planning for new buildings or modification of existing facilities takes into account the requirements for possible future automated installations.

Rationale: It is cheaper and more convenient to make necessary modifications ahead of time, than after a building is occupied.

4. Libraries should review major functional areas, and prepare specific implementation plans, if automation is determined to be warranted.

Rationale: An integrated planning process must be accompanied and supplemented by more detailed area plans, to determine workloads, costs, productivity and potential alternatives.

Information

5. Alberta Culture should review its statistical reporting requirements, with a view to the collection of additional data, useful in the process leading to a decision to automate.

Rationale: The decision to automate is heavily dependent on the availability of functional area cost figures, and workloads. This information is not now easily available in a consistent form.

6. An ongoing process of information updating and sharing should be established.

Rationale: The information in these studies will be partly outdated in twelve months. In addition some of the target libraries might well profit from workshops, seminars and courses in relation to current developments in computer based systems and implementation projects.

7. Libraries initiating computer installations should keep the Alberta library community informed of their progress.

Rationale: Practical information gained in the course of actual installations is of immense value, especially if conveyed first-hand. Some of this information rarely appears in printed reviews.

Financial

8. Libraries intending to inplement a computer based system in the future, should establish an automation reserve fund.

Rationale: Even libraries planning for small systems, or those considering implementation on a municipal computer, should establish such a fund. The most guaranteed barrier to automation is the lack of funds. Even small implementations can be more costly than envisaged. Very few libraries could afford more than the smallest project from a single year's budget. This is proportionately just as much a problem for a small library as for a large library.

9. A system of provincial grants for assistance in automated projects should be established.

Rationale: Some form of conditional assistance will encourage computer developments to proceed in a co-ordinated fashion. This does not just apply to networks. Even stand alone systems can be more or less compatible or easily interfaced. In addition, local authorities may be more likely to make funds available, if additional grants can be obtained. There is also a psychological value, especially for smaller libraries, in the knowledge that development is not proceeding in isolation.

10. A system of program budgeting should be considered.

Rationale: Program budgeting provides library managers with an effective tool for establishing the costs of services and functions. The establishment of such costs is essential for the process of cost benefit analysis.

Management

11. Library managers should regard it as a priority to keep informed on developments in computer technology for library applications.

Rationale: The field is changing very rapidly. Only a consistent process of professional development can ensure that the librarian remains in control of the automation process. If such control leaves the library, experience suggests that resulting applications will be often be less appropriate.

12. A cost benefit analysis of at least the major functional areas should be undertaken in the target libraries.

Rationale: No decision on automation can be properly made without the accurate data available from this process.

13. Library managers should make it a priority to acquire detailed knowledge of their local municipal computer systems.

Rationale: Several successful systems are available and have been implemented on municipal computers. This approach can reduce costs. The library manager who understands the municipal system, can interact more successfully with local authorities and planners.

14. Libraries should review and refine their statistical record keeping.

Rationale: A number of libraries were unable easily to supply various kinds of data. The absence of certain kinds of information makes it difficult or impossible to establish the true workload and consequent costs in functional areas.

Operations

15. Libraries contemplating future sharing arrangements should begin to co-ordinate cataloguing policies and circulation procedures.

Rationale: One of the more difficult and costly aspects of implementing shared arrangements in the automated mode is such co-ordination. The process is greatly facilitated if this process has begun before hand. It reduces tension between autonomous organizations, and provides experience in formal co-operation. In addition there can be tangible benefits even in the manual mode, in the easier interchange of information, materials, and perhaps borrowers.

16. Libraries within 30 miles of existing automated library installations should consider installing a dial up terminal.

Rationale: This would be an excellent supplement to existing inter library loan arrangement, which could speed up location determination, and service. The facility could also conceivably be used in the cataloguing and acquisitions process. It could also provide access to other data bases. Thirty miles is a commonly accepted maximum distance for reasonable communications costs.

17. Libraries should include ISBN and LCCN information on their catalogue records, whether manual or machine, when available.

Rationale: These numbers constitute the quickest, easiest, cheapest and most accurate way to access catalogue records in a machine data base. Their availability would immeasurably facilitate future retrospective conversion projects.

18. If possible, libraries using manual cataloguing systems, should make an additional machine readable record, of at least the numerical search keys.

Rationale: The machine readable record will be of great benefit in any subsequent conversion project. This recommendation can be accomplished using micro computers and floppy disks, or magnetic tapes; by simply recording the numbers on dictaphone, or by using commercial vendors, in certain circumstances.

19. The processes identified in Recommendations 17 and 18 should be extended to previously created records.

Rationale: The same reasons warrant this, as for the previous two recommendations.

20. Libraries using a machine cataloguing system, or intending to implement one, should utilize a MARC compatible record.

Rationale: Such a record structure is the international standard. Libraries which have chosen to deviate from that standard have almost always regretted the decision. It leads to difficulties of communication with other systems and libraries, and often entails unanticipated costs for later upgrading or on line conversion for communications. Brief records often restrict the flexibility of the system in the addition of new library applications.

21. Libraries should make a conscious decision as to whether inter library loan is provided as a reference related, or a circulation related service, and consequently whether it should be actively promoted, or passively supplied.

Rationale: The specific objective of inter library loan, partly conditions the volume of transactions. This applies both to individual libraries, and to the provincial system as a whole. Inasmuch as ILL may be considered one reason for automating, the salience of the service itself is obviously of great relevance. This question should probably be addressed at the provincial level.

General Recommendations

22. The target libraries should make a conscious effort to keep informed of automated developments in the college libraries.

Rationale: A number of the college libraries have implemented various computer projects. Especially for public libraries which are not close to larger public systems, possible joint developments with a local college library may provide a feasible approach to automation. Such co-operation would be in keeping with the present network of public/college library informal agreements. In any potential regional co-operative development, such co-ordination should also be considered.

23. Individual libraries should keep informed on provincial and national library computer developments.

Rationale: National and provincial strategies for network development are based on a concept of decentralized linked local systems. Such linking will be facilitated if local installations occur in compatible fashion with wider developments.

24. Libraries close to the two regional libraries and to Edmonton, Calgary or Lethbridge Public Libraries should seek to implement any automated systems either in conjunction with those libraries, or compatibly with a view to later co-ordination.

Rationale: While these libraries may well be unable to undertake any formal shared implementations, immediately, the dynamics of computer development and library co-operation make future co-operation highly probable.

25. Libraries without access to computers should consider purchase of a micro computer.

Rationale: A micro computer provides an inexpensive, relatively non-threatening way of becoming familiar with the capabilities of modern computer technology. In addition, micros are quite capable of supporting a wide variety of library and general office applications, as well as being required for the provision in the library of information in new formats. Micro computers can be bought for as little as a $1000.

26. Small libraries should investigate the various micro computer based library applications packages now available.

Rationale: Several of these systems exist. They may provide a relatively inexpensive method of dealing with the requirements of small libraries.

27. Alberta Culture should consider funding a test micro computer library systems installation in a demonstration small library.

Rationale: Such a demonstration would provide a working example of a small, inexpensive system. Many librarians, not only in the smaller libraries, might profit from such an opportunity to examine a system's capabilities. The demonstration would constitute a logical follow up to the present study of micro computers which is being funded by Alberta Culture at Fort McMurray Library

INTRODUCTION TO THE TABLES

The following tables fall into three groups. The first consists of a series which provide summary statistics for each of a number of activities performed in the libraries studied. The second combines this information with data on staff and salary levels, to provide cost estimates for the staff component of these activities. It should be noted that not all libraries provided salary data. These libraries are ommitted from these calculations. The third group of tables sets out various cost comparisons between the target public libraries, and the three other groups selected for comparison.

The information presented in the tables was obtained almost in its entirety from written and oral responses from the libraries concerned. All figures are for 1982 unless otherwise noted. A small amount of confirmatory and supplementary information was obtained from other sources, including publications of Alberta Culture. Some caution should be used in evaluating the data, and the calculations based thereon. In some instances, libraries could not provide firm figures, but instead gave estimates. In other cases, certain information was not available at all. In one or two instances the consultants made certain extrapolations from other data to provide estimates where libraries themselves did not give a response. For these reasons, the data here included should not be interpreted as constituting a rigorous presentation in any statistical valid sense. No sampling techniques were used. No attempt was made to control for the various possible sources of statistical invalidity or unreliability. Instead, the data are presented, and are intended to be used as a real representation, to the degree of accuracy that the situation permitted, of the actual situation in twenty three libraries in 1982/83.

In a few instances, figures have been rounded. In a minority, but noticeable number of responses, libraries provided estimates. These two kinds of case are not specifically identified in the tables. Where other qualifications apply, they are footnoted. A blank entry in the table indicates that the information was either not available, or was too unreliable to be used. Information in the tables is presented anonymously.

The number of libraries used to calculate various ranges, means, etc. differs in most instances, owing to inconsistencies in completion of the instrumentation. In some of the subgroupings of libraries, figures for only one library were available. Such instances are identified. All staff cost calculations include an appropriate amount for fringe benefits.

Table I

Summary Statistics

Circulation

Library	Type of System	Volume			Number of FTE Staff	Number of Requests	Number of Overdues, etc.
		Books	Serials	Other			
A	Recordak	276969	2282	9235	4.5	4400	500
B	Recordak	236572	12215	16797	4.33	4980	5248
C	Recordak	453440		18357	7.8	8560	20000
D	Manual	111490	6450		2.2		480
E	Manual	317757					
F	Manual	136000	1000	10119	6.0	532	2050
G	Manual	310891	2064	12576	6.75		6589
H	Manual	1250000					
I	Manual	43285**			3.25		0
J	Manual	26529	2926	4814	12.1		2500
K	Manual	36328			0.65		
L	Manual	208780		6742			
N	Recordak	127173			3.66	2600	3849
O	Manual	40591	904		0.5		100
P	Manual	4263443**				120000	
Q	Manual	19800**			4.0		
R	Manual	527808		31966	4.0		20750
S	Manual	16708	6967				1346
T	VAX 11/780	83037	19435	7110	5.0		
U	Recordak	785468		460	22.2	17414	12000
V	ULISYS	205272**			12.7	899	12673
W	Recordak	529757**			15.8	15767	8464

** Identified as the total number of all circulations

Table II

Summary Statistics

Acquisitions (Monographs)

Library	Type of System	Number (titles)*		Number (items)*		Number of Staff (FTE)
		Books	Other	Books	Other	
A	Manual	7352	402	(est)8454	402	1.1
B	Manual	7312	718	8885	718	2.0
C	Manual	11334	1186	15204	1422	0.35
D	Manual	2900	272			
E	EasyData	21708**		45225**		3.58
F	DBMaster			5396	707	0.5
G	Manual			9485	709	2.0
H	Manual			52550**		2.0
I	Manual	6035**				1.4
J	Manual	3044	683			0.33
K	Manual	870**		870**		0.125
L	MINISIS	6369		26269		0.03
N	Manual	5661	311	5661	311	0.55
O	Manual	2079		2079		0.41
P	EasyData			72140**		2.5
Q	Manual	2400**				1.3
R	Manual	18500	2500			1.5
S	Manual	1505	322	1505	322	0.25
T	VAX 11/780	5717	1012	6500	15280***	4.2
U	Manual	10000		24438		3.0
V	Manual			7280	504	2.3
W	Manual			10794		1.0

* Identified as number received
** Identified as total of books plus other
*** Mostly slide sets

Table III

Summary Statistics

Acquisitions (Serials)

Library	Type of System	Number of Subscriptions	Number of Standing Orders	Number of Staff
A	Manual	111	100	0.1
B	Manual	229	0	0.25
C	Manual	357	241	0.3
D	Manual	85		0.2
E	Manual	30	86	0.1
F	Manual	110	10	0.2
G	Manual	265	0	0.07
H	Manual	1593 (91)*	(8)*	0.43
I	Manual	789	70	1.1
J	Manual	433		0.33
K	Manual	20	11	0.002
L	Manual	55	22	0.03
N	Manual	150	400	
O	Manual	20	2	0.2
P	Manual	2604		0.5
Q	Manual	480	200	0.5
R	Manual	493	1500	0.5
S	Manual	425	76	1.0
T	Manual	1000	400**	2.0
U	Manual	761	600	4.0
V	Manual	1150	250	1.1
W	Manual	300	160	0.5

* Figures in brackets are for HQ only

** These items are handled in the acquisitions (monographs) unit

Table IV

Summary Statistics

Cataloguing

Library	Type of System	Number (titles)		Number (items)		Number of Staff	Size of Backlog
		Books	Other	Books	Other		
A	Manual	2000	200	2200	225	2	0
B	Manual	7312		9345		1.55	3487
C	Manual	1773	587			0.84	0
D	Manual			4729	266	1.25	0
E	EasyData	12000**		25000**		4.9	0
F	Manual	4000		5500		1.3	200
G	Manual			9485	1082	1.1	0
H	Manual			76528*	63	6.2	131
I	Manual			5491**		3.3	0
J	Manual	3727**				1.23	0
K	Manual	1219		1219		0.15	0
L	Manual	4420**		9507**		2.00	3000
N	Manual			2186		1.95	0
O	Manual	2000		2000		0.2	1200
P	EasyData	10980	646	75115	1244	8.5	0
Q	UTLAS	3000	1000			2.3	5000
R	Manual	9000	1450	12050**		5.0	5000
S	Manual	3719	1443	4266	1975	0.8	2500
T	Manual	6717	237	7379	5872	6.1	500
U	UTLAS	7050		23696		5.4	8000
V	Manual			7260	504	3.8	1200
W	Dartmouth			2668		1.0	2550

* This is the total number processed. It includes items not catalogued.
** Identified as total for all items

Table V

Summary Statistics

Processing

Library	Number of Cards Filed	Number of Card Sets Purchased	Number of Record Changes
A	55000	5400	
B	30000	3910	256
C		4847	786
D	23917		2
E	12000*	0	
F	20000		500
G	33198	0	3000
H	130000	21000	50725
I			
J	20000	124	
K		0	
L	4420*	0	
N		992	
O		1800	
P	11827	0	300,000**
Q	15000	1582	
R	12000	7000	
S	10000	850	838
T	20000	4000	400
U			
V			
W			1500

* order slips
** including location changes

N.B. The cost of card sets varies with options selected, and from one supplier to another. The general range is from $0.50 to $3.00

Table VI

Summary Statistics

Inter Library Loan

Library	Number of Staff	Number of Transactions	
		Borrowed	Lent
A	1	236	832
B	0.2	553	6
C	0.47	441	354
D	0.05	550	5
E	1.4	1014	231
F	0.6	578	71
G	0.625	377	1509
H	2.33	431	538
I	0.33	300	65
J		111	13
K	0.15	768	1
L	0.67	5880	35
N		498	759
O	0.2	357	0
P		523	89
Q	0.2	64	67
R	1.1	693	2200
S	0.14	98	25
T	1.0	398	276
U	0.5	1075	679
V	0.3	297	125
W	0.05	244	266

Table VII

Staff Costs

And Related Data

Circulation

Library	Cost/(cents) Transaction	Volume/ Staff FTE	Budget/ % Total*	Staff/ % Total	Circ. per Capita
A	0.21	82050	13	20.9	5.9
B	0.37	40111	19.8	24.5	8.5
C	0.27	60486	25.1	29.1	10.13
D	0.36	53609	17.8	38.6	9.7
E					2.96
F	0.89	24519	38.1	37.5	4.78
G	0.50	37203	34.4	30.68	8.15
H					13.29
I	1.49	13318	13.67	16.32	
J					
K	0.20	55889	25.25	43.33	10.4
L					4.58
N	0.37	34718	20.68	28.15	5.26
O	0.22	82990	22.9	16.6	5.02
P					8.66
Q	1.06	4950	10.98	57.14	
R	0.18	139943	12.0	9.8	9.93
S	1.49		9.87		
T		21916			
U	0.57	35402	37.47		8.27
V	1.24	14662	30.1	36.6	
W	0.40	33402	31.72	65.4	8.73

	For Alberta Libraries Only	
Item	Range	Mean
Cost/transaction	0.18 - 1.49	0.63
Volume/FTE	4950 - 139943	47597
Budget %	9.87 - 38.1	20.98
Staff %	9.8 - 43.33	29.94

* % of total staff budget

N.B. Regional libraries omitted

Table VIII

Staff Costs

And Related Data

Acquisitions (Monographs)

Library	Cost/ Title	Cost/ Item	Titles/ FTE	Budget/ % Total*	Staff/ % Total
A	3.10	2.71	7049	4.1	5.8
B	3.93	3.28	4015	5.8	13.4
C	0.62	0.47	41733	1.49	1.34
D					
E	2.66	1.27	6063	16.5***	
F		1.80	12206**	3.36	3.1
G		5.99	4746**	12.7	9.1
H		0.77	26275**		19.8***
I	4.28		4310	5.48	7.0
J	1.77		11300	3.84	
K	2.02	2.02	6960	6.07	5.9
L	4.07	0.98	6367	5.98***	13.08***
N	3.10	3.10	10858	8.16	4.2
O	3.52	3.52	5070	18.3	13.3
P			28856**		
Q	11.46		1846	14.45	18.5
R	1.29		14000	3.23	3.68
S	4.82	4.82	7288	2.46	2.0
T	10.18	3.14	1602		
U	6.57	2.69	3333	5.43	
V		5.69	3384**	5.23	6.62
W		1.51	10794**	2.5	4.12

	For Alberta Libraries Only	
Item	Range	Mean
Cost/title	0.62 - 11.46	4.06
Cost/item	0.46 - 5.99	2.83
Titles/FTE	1602 - 41733	9175
Budget %	1.49 - 18.3	6.76
Staff %	1.34 - 18.5	7.23

* % of total staff budget
** Calculated for items rather than titles
*** For HQ only

Table IX

Staff Costs

Acquisitions (Serials)

Library	Cost/ Title	Titles/ 0.1 FTE	Budget/ % Total*	Staff/ % Total
A	7.31	211	0.26	0.5
B	21.55	95	1.0	1.41
C	7.32		0.83	1.15
D	44.92	42.5	3.38	0.03
E	21.77	116	0.72	0.54
F	20.00	55	0.67	1.25
G	15.05	344	0.83	0.31
H				
I	21.27	78	3.87	5.52
J	15.25	131	3.8	
K	1.19	1050	0.08	0.09
L	7.70	256	0.13	0.25
N				
O		11	10.69	6.66
P				
Q	12.94	136	4.62	7.14
R	4.54	398	1.07	1.22
S	45.92	50	6.45	8.0
T	55.25	50		
U	48.11	34	5.4	
V	19.54	127	3.2	3.17
W	23.10	92	1.6	2.06

	For Alberta Libraries Only	
Item	Range	Mean
Cost/title	1.19 - 55.25	20.10
Title/0.1FTE	11 - 1050	197
Budget %	0.08 - 10.69	2.6
Staff %	0.03 - 8.0	2.48

* % of total staff budget

Table X

Staff Costs

Cataloguing and Processing

Library	Cost/Title Catalogued	Cost/item Catalogued	Titles/ FTE	Items/ FTE	Budget/ % Total*	Staff/ % Total
A	3.69	3.50	3877	4428	5.27	10.5
B	5.63	4.40	4717	6029	8.31	8.79
C	7.83		2809		3.52	3.23
D				3996		21.92
E	8.38	4.02	2448	5102	28.78	26.92
F	8.25	6.00	3076	4230	9.65	8.12
G				9606		
H		1.35**		12353	51.0***	
I		9.81		1663	11.43	16.57
J	4.73		3056		10.24	
K	1.60	1.60			6.7	7.1
L	7.39	3.43	2210	4753	7.5	16.6
N		14.34		1121	13.78	15.0
O	2.75	2.75	10000	10000	13.7	6.6
P						
Q	12.76		1739		26.84	32.85
R	10.48	9.10	2090	2410	13.0	12.27
S	2.79	2.31	6452	7801	4.04	6.4
T	18.90	9.92	1140	2172		
U	18.65	5.55	1305	4388	10.88	
V		9.32		3882	8.5	10.9
W		14.41	2668		5.8	4.1

	For Alberta Libraries Only	
Item	Range	Mean
Cost/title	1.06 - 18.90	7.32
Cost/item	1.60 - 14.34	6.19
Titles/FTE	1140 - 10000	3634
Items/FTE	1121 - 12353	5303
Budget %	3.52 - 28.78	11.42
Staff %	3.32 - 32.85	13.58

* % of total staff budget
** Reflects cataloguing and processing
*** % of HQ only

N.B. An additional component of cataloguing costs is found in relation to purchased card sets. Table V presents information on the volume of these purchases for the libraries studied.

Table XI

Staff Costs

Inter Library Loan

Library	Cost/Item Borrowed/Lent	Items/ FTE**	Budget/ % Total***	Staff/ % Total
A	14.74	1068	2.68	5.26
B	6.49	2795	0.7	1.34
C	9.30	1690	1.4	1.8
D	1.56	11200	0.37	
E	24.66	889	8.78*	7.69*
F	11.86	1081	2.35	3.75
G	9.11	3017	3.59	2.84
H****	40.75 (4.40)	415 (3848)	19.1*	12.04*
I	2.74	1166	0.21	1.65
J				
K	2.42	5126	6.42	7.1
L	2.04	8380	2.65*	5.58*
N				
O	8.56	1785	7.64	6.66
P				
Q	13.74	655	0.94	2.85
R	7.81	2893	2.7	2.4
S	28.61	1230	0.98	0.8
T		674		
U	6.87	3508	1.0	
V	16.32	1405	0.81	0.86
W	3.60	5400	0.14	0.2

	For Alberta Libraries Only	
Item	Range	Mean
Cost/Item	1.56 - 28.61	10.66
Items/FTE	655 - 11200	2812
Budget %	0.37 - 8.78	2.81
Staff %	0.8 - 7.69	3.61

* For HQ staff only
** i.e. Per staff FTE
*** % of total staff budget
**** Figures in brackets include 7999 system ILL's
N.B. Most libraries use less than 1 FTE for this function. Figures are therefore inflated.

Table XII

Cost Comparisons - Circulation

	Alberta Public	B.C.	Alberta Colleges
Cost/Transaction			
Range	0.18 - 0.89	0.40 - 0.97	1.06 - 1.49
Mean	0.36	0.48	1.32
Volume/FTE			
Range	24519 - 139943	33402 - 35402	4950 - 21916
Mean	61151	34402	13711
Budget %			
Range	12.0 - 38.1	31.72 - 37.47	9.87 - 30.1
Mean	22.9	34.59	16.16
Staff %			
Range	9.8 - 43.33		16.32 - 57.14
Mean	27.92	65.4*	36.69

* Single library

Table XIII

Cost Comparisons

Acquisitions (Monographs)

	Alberta Public	B.C.	Alberta Colleges
Cost/Title			
Range	1.29 - 4.07		1.77 - 11.46
Mean	2.70	1.29#	6.50
Cost/Item			
Range	0.47 - 5.99	1.51 - 2.69	3.14 - 5.69
Mean	2.36	2.10	4.55
Title/FTE			
Range	4015 - 41733		1602 - 11300
Mean	11346	3333#	5269
Budget %			
Range	1.49 - 18.3	2.5 - 5.43	2.46 - 14.45
Mean	7.02	3.96	6.29
Staff %			
Range	1.34 - 13.4		2.0 - 18.5
Mean	6.65	4.12#	8.53

Single library

Table XIV

Cost Comparisons

Acquisitions (Serials)

	Alberta Public	B.C.	Alberta Colleges
Cost/Title			
Range	1.19 - 44.92	23.10 - 48.11	12.94 - 55.25
Mean	15.14	30.61	28.36
Volume/0.1 FTE			
Range	11 - 1050	34 - 92	50 - 136
Mean	258	63	95
Budget %			
Range	0.08 - 10.69	1.6 - 5.4	3.17 - 8.0
Mean	1.79	3.5	4.39
Staff %			
Range	0.03 - 1.41		3.17 - 8.0
Mean	1.22	2.06*	5.96

* Single library

Table XV

Cost Comparisons

Cataloguing and Processing

	Alberta Public	B.C.	Alberta Colleges
Cost/Title			
Range	1.60 - 8.38		2.79 - 18.90
Mean	6.22	18.65*	9.80
Cost/Item			
Range	1.60 - 14.34	5.55 - 14.41	2.31 - 9.81
Mean	5.46	9.98	7.84
Title/FTE			
Range	2090 - 10000	1305 - 2668	1140 - 6452
Mean	3943	1986	3096
Item/FTE			
Range	1121 - 12353		1663 - 7801
Mean	5820	4388*	3879
Budget %			
Range	3.52 - 28.78	5.8 - 10.88	4.04 - 26.84
Mean	11.02	8.04	12.21
Staff %			
Range	3.23 - 26.92		6.4 - 32.85
Mean	12.46	4.1*	16.68

* Single library

Table XVI

Cost Comparisons

Inter Library Loan

	Alberta Public	B.C.	Alberta Colleges
Cost/Item			
Range	1.56 - 24.66	3.60 - 6.87	2.74 - 28.62
Mean	8.96	5.13	15.35
Items/FTE			
Range	889 - 11200	3508 - 5400	655 - 1405
Mean	3629	4454	1014
Budget %			
Range	0.37 - 8.78	0.14 - 1.0	0.21 - 0.98
Mean	3.54	0.57	0.74
Staff %			
Range	1.34 - 6.66		0.80 - 2.85
Mean	4.44	0.2*	1.54

* Single library

APPENDIX

COST BENEFIT ANALYSIS MODEL

Introduction

The model outlined in the following pages has eight sections.

1. Multi year costing layout for present system, by function (in constant dollars) {Form #1}
2. Guide Sheet To Form #1
3. Multi year costing layout for new system, by function (in actual, inflated dollars) {Form #2}
4. Multi year costing layout for total new system for all functions (in actual, inflated dollars) {Form #3}
5. Guide Sheet To Form #s 2, 3
6. Summary comparison layouts, by function {Form #4}
7. Summary comparison layouts, for total present and automated systems {Form #5}
8. Summative layout of total functions for #1 {Form #6}

MULTI YEAR COSTING LAYOUT FOR PRESENT SYSTEM, BY FUNCTION

IN CONSTANT DOLLARS

FORM #1

COST BENEFIT ANALYSIS SHEET LIBRARY NAME.. FORM # 1

PRESENT SYSTEM FUNCTION..

Costed Item Annual Costs	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Staff										
Fringe Benefits										
Total Staff										
Supplies										
Equipment										
Maintenance										
Other										
Total										
Running Total										

N.B. In this calculation do not make allowance for inflation. The figures for each year should only change as a result of changes in volume of business, contractual agreements for external services (e.g. for maintenance agreements), and the like.

GUIDE SHEET FOR COST BENEFIT ANALYSIS

FORM #1

GUIDE SHEET FOR COST BENEFIT ANALYSIS - Form #1

In completing Form #1, the following steps should be carried out:

STAFF

1. Identify each staff member (including professional, technician, clerical and administrative) employed in some way on the function. This should include not only those staff whose regular duty it is to perform the function, but also those whose duties may only occasionally include work in the area.

2. Identify the proportion of time each staff member spends in carrying out duties in this function, and convert to FTE's.

3. Cost total FTE's for the function. Include fringe benefits.

SUPPLIES, EQUIPMENT, MAINTENANCE

1. Identify each piece of function-specific equipment and all supplies used for the function during a year. Do not include general furniture and equipment such as chairs, typewriters, etc.

2. For supplies, identify full costs during a single typical financial year.

3. For equipment, either identify purchase costs, or identify the amortization costs during a full financial year.

4. Identify all maintenance costs attributable to the function. E.g. Upkeep of Recordak circulation machine.

OTHER

1. Identify all services purchased for the function. E.g. Purchase of catalogue cards; subscription to cataloguing tools; agency fees to a subscription agency.

2. Identify the costs of such services during one full typical financial year.

3. Identify any other direct costs associated with the function. E.g. Courier costs; postage; transportation; write-offs; fees paid to collection agencies.

4. Identify any indirect costs attributable to the function, if these were not previously included in staff or other costs. E.g. Costs of staff time to correct supplier errors (such as incorrect cataloguing, spine lables, etc.)

In this calculation do not make allowance for inflation. The figures for each year should only change as a result of changes in volume of business, contractual agreements for external services (e.g. for maintenance agreements), and the like.

MULTI YEAR COSTING LAYOUT FOR NEW SYSTEM, BY FUNCTION

(IN ACTUAL, INFLATED DOLLARS)

FORM #2

COST BENEFIT ANALYSIS SHEET LIBRARY NAME.. FORM # 2

AUTOMATED SYSTEM NAME............ FUNCTION..

Assigned Total Adjusted Implementation and Development Costs ....
Assigned Total Adjusted Annual Operating Costs
Over .... Years (in constant dollars) ....
Total Assigned Costs ....

Implementation and Development Costs

Costed Item Assigned Annual Costs for Function	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Staff										
Equipment										
Other										
Total										
Inflation Factor........										
Adjusted Costs										
Running Adjusted Totals										

Annual Operating Costs

Costed Item Assigned Annual Costs for Function	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
1. Staff										
2. Fringe Benefits										
3. Total Staff										
4. Supplies										
5. Equipment										
6. Maintenance										
7. Other										
8.										
9.										
10.										
11.										
12. Total										
13. Inflation Factor........										
14. Adjusted Cost										
15. Running Adjusted Totals										

Assumed Inflation Rate ......

N.B. In this calculation do make allowance for inflation in lines 1 to 25. The figures for each year should change both as a result of changes in volume of business, contractual agreements for external services (e.g. for maintenance agreements), and the like, and be adjusted according to the expected rate of inflation for each year. In the present economic situation, it would be wise to make several calculations, using different inflationary expectations. Lines 13 to 15 adjust these figures back to constant dollars to permit the comparison on Form #3.

MULTI YEAR COSTING LAYOUT FOR TOTAL NEW SYSTEM FOR ALL FUNCTIONS (IN ACTUAL, INFLATED DOLLARS)

FORM #3

COST BENEFIT ANALYSIS SHEET LIBRARY NAME... FORM # 3

AUTOMATED SYSTEM NAME............ FUNCTIONS...

Total Adjusted Implementation and Development Costs ....
Total Adjusted Annual Operating Costs
Over .... Years (in constant dollars) ....
Total Costs ....

Implementation and Development Costs

Costed Item Annual Costs	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Staff										
Equipment										
Other										
Total										
Inflation Factor........										
Adjusted Costs										
Running Adjusted Totals										

Annual Operating Costs

Costed Item Annual Costs	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
1. Staff										
2. Fringe Benefits										
3. Total Staff										
4. Supplies										
5. Equipment										
6. Maintenance										
7. Other										
8.										
9.										
10.										
11.										
12. Total										
13. Inflation Factor........										
14. Adjusted Cost										
15. Running Adjusted Totals										

Assumed Inflation Rate......

N.B. In this calculation do make allowance for inflation in lines 1 to 25. The figures for each year should change both as a result of changes in volume of business, contractual agreements for external services (e.g. for maintenance agreements), and the like, and be adjusted according to the expected rate of inflation for each year. In the present economic situation, it would be wise to make several calculations, using different inflationary expectations. Lines 13 to 15 adjust these figures back to constant dollars to permit the comparison on Form #3.

GUIDE SHEET FOR COST BENEFIT ANALYSIS

FORMS #2, #3

GUIDE SHEET FOR COST BENEFIT ANALYSIS - Forms #2, #3 Page A

General Comments

These sheets will always be completed for a specific system. In order to carry out an adequate cost analysis, it will be necessary to decide what specific functions the system is to provide, and the system package (hardware and software) required to carry out those functions. The first step in this process is to issue a Request For Information (RFI), to those vendors whose systems appear of interest. Two caveats are important. In the first place it is wise to treat information supplied by vendors, especially on system capabilities with some caution. Secondly, information obtained at this stage, and calculations based on it, will require revision later, as final requirements are more clearly understood. It is always wise to talk with other users of the system, if possible, and obtain their figures.

Implementation and Development Costs

The costs of implementing an automated system are of two kinds. The first are "one-time" costs, perhaps paid out over a period of years, but eventually ceasing. These are referred to as Implementation and Development Costs. They include the cost of the computer system itself, and any ancillary hardware; costs of software, or software licenses; leasing costs if a lease to purchase plan is used; site preparation; installation costs; staff costs for set-up; training; documentation and conversion costs.

The Implementation and Development costs should include a contingency figure of ten per cent to cover unforeseen costs.

Annual Operating Costs

The second type of costs are those recurring charges entailed in the ongoing operation of the automated system. The distribution of these, as between staff and other kinds of costs, will usually be different from the distribution found in running a non-automated system. In particular, in the first years of implementation, it cannot be assumed that these costs will be stable from year to year, or change only with volume of business. The number of staff required may vary as the system is gradually implemented in full, or as it is used for more functions. Prearranged maintenance and other contractual charges may vary over time. Use of a host computer elsewhere may be subject to fluctuating charges. Acquisition of additional equipment and software, may be planned over a period of years, as demand is expected to warrant it, or as it becomes available. System upgrades in particular may be known in advance and budgeted for. The following steps should be carried out:

GUIDE SHEET FOR COST BENEFIT ANALYSIS - Forms #2, #3 Page B

STAFF

1. Identify each staff member (including professional, technician, clerical and administrative) expected to be employed in some way on the function. This should include not only those staff whose regular duty it will be to perform the function, but also those whose duties may only occasionally include work in the area.

2. Identify the proportion of time each staff member is expected to spend carrying out duties in this function, and convert to FTE's.

3. Cost total FTE's for the function. Include fringe benefits.

N.B. Staff calculations should take account of the following possibilities.

> There may be a reduction in costs of personnel directly involved working in the function. Include personnel cost reductions, however, only if an identified position to be eliminated can be identified, not if time is merely freed to perform other duties.
>
> There may be a reduction in administrative personnel costs.
>
> There may be a reduction in costs due to error correction and forms production.
>
> There may be reduced staff growth through greater productivity.

SUPPLIES, EQUIPMENT, MAINTENANCE

1. Identify each piece of function-specific equipment and all supplies used for the function during a year. Do not include general furniture and equipment such as chairs, typewriters, etc.

2. For supplies, identify full costs during a single typical financial year.

3. For the initial system equipment purchase, establish the expected life time. Municipalities often specify this. Ten years is a commonly used period.

4. Include amortization costs of the equipment over the lifetime period chosen.

5. For all other equipment, include either average annual purchase costs, or amortization figures.

6. Identify all maintenance costs attributable to the function.

OTHER

1. Identify any services purchased for the function. This information should be available from the vendor.

2. Identify the costs of such services during one full typical financial year.

3. Identify any other direct costs associated with the function. E.g. Courier costs; postage; transportation; write-offs; communications.

4. Identify any indirect costs attributable to the function, if these were not previously included in staff or other costs.

ADJUSTMENT FOR INFLATION

Because the process of implementing an automated system includes both "one-time" and ongoing costs, and because these will not all necessarily remain stable for the pay-back period, the cost figures on these sheets should be expressed in the real expected dollars, taking into account projected inflation. The forms then allow for an adjustment to bring these costs back to constant dollars, so as to permit an accurate comparison with the costs of present systems.

This adjustment can be carried out on the basis of any inflation figure, so long as it is consistent with inflationary assumptions made in the cost analysis.

Deflation factors for some typical inflation figures are as follows:

Inflation Rate	Deflation Factor				
	Year 1	Year 2	Year 3	Year 4	Year 5
5%	.95	.907	.863	.822	.783
8%	.925	.857	.793	.735	.68
10%	.909	.826	.751	.683	.62
12%	.892	.797	.71	.635	.567
15%	.870	.756	.658	.572	.497

To find the value, in today's dollars, of $100,000 one year from now, if the assumed inflation rate is 5%, multiply the figure by 0.95. For $200,000, in two years, at 8%, multiply by 0.857. (E.g. In 1985, $200,000 will equal $171,400 1983 dollars, at 8%)

SUMMARY COMPARISON LAYOUTS

BY FUNCTION

FORM #4

COST BENEFIT ANALYSIS SHEET LIBRARY NAME.. FORM # 4

AUTOMATED SYSTEM NAME............. FUNCTION...

Total Adjusted Implementation and Development Costs ....
Total Adjusted Annual Operating Costs
Over .... Years (in constant dollars) ....
Total Costs ....

	Year 1	Change	Year 2	Change	Year 3	Change	Year 4	Change	Year 5	Change	Year 6	Change	Year 7	Change
Present System (Annual)														
Automated System (Annual)														
Present System (Running Change Total)														
Automated System (Running Change Total)														

N.B. Break even point occurs in the year in which the change becomes positive.

SUMMARY COMPARISON LAYOUTS
FOR TOTAL PRESENT AND AUTOMATED SYSTEMS

FORM #5

COST BENEFIT ANALYSIS SHEET LIBRARY NAME.. FORM # 5

AUTOMATED SYSTEM NAME............. FUNCTIONS..

Total Adjusted Implementation and Development Costs ....
Total Adjusted Annual Operating Costs
Over .... Years (in constant dollars) ....
Total Costs ....

	Year 1	Change	Year 2	Change	Year 3	Change	Year 4	Change	Year 5	Change	Year 6	Change	Year 7	Change
Present System (Annual)														
Automated System (Annual)														
Present System (Running Change Total)														
Automated System (Running Change Total)														

N.B. Break even point occurs in the year in which the change becomes positive.

SUMMATIVE LAYOUT OF TOTAL FUNCTIONS

FOR PRESENT SYSTEM

FORM #6

COST BENEFIT ANALYSIS SHEET LIBRARY NAME.. FORM # 6

PRESENT SYSTEM FUNCTIONS INCLUDED...................................

Total Annual Cost by Function	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							
Total							
Running Total							

APPENDIX II

GLOSSARY OF TERMS

Introduction

The following glossary is intended to explain many of technical terms used in the five studies in this series. The list also includes a number of other words, not found in the studies, which are commonly used in discussion of computers and automated library techniques.

ACOUSTIC COUPLER	a device attached to a terminal, to which a telephone handset is connected. It transforms the terminal's electrical signals into audible ones which the telephone can then convert into electrical signals for transmission to a distant computer and vice versa. See also MODEM.
ACT	ACcumulator, Temporary (in the 8060 microprocessor).
ADA	a high-level language sponsored by the Department of Defense originally for real-time systems programming.
ADD-ON	circuitry or system that can be attached to a computer to increase memory or performance.
ALPHANUMERIC	a character which is a letter or a number.
APL	A Programming Language. A high-level programming language invented by Kenneth Iverson, and used for algorithmic interactive programming.
APPLE	a brand of microcomputers using the Mostech 6502 chip.
ASCII	acronym for American Standard Code for Information Interchange. A standardized system of binary numerical representation used by computers for generating letters, numbers, and special characters. All personal computers use this standard.
ASSEMBLER (language)	a computer programme that translates symbolic coding into machine instructions that are placed in the computer CPU memory, and that instruct the computer through a sequence of operations.
BATCH PROCESSING	processing a number of similar input items in one group (BATCH) to run on the computer at the same time.
CHIP	a small piece of material (usually silicon) which contains thousands of circuit elements.
COBOL	acronym for COmmon Business Oriented Language. A programming language developed for business applications which is available on some microcomputers.

CODE	information written in computer readable form. It is a symbolic representation for data.
COMMAND	an instruction to the computer to execute.
COMMODORE	manufacturer of business machines including several microcomputers.
COMPILER	a program that translates one computer language into another. Most commonly, the term refers to a program that translates a higher level language into the computer's native language.
CONVERSION	the process of changing data from one form, such as a manual card file, to another form, such as computerized magnetic tape.
CP/M	Control Program for Microcomputers. A standardized operating system (OS) for 8080, Z-80, and 8085 based microcomputers.
CPU	Central Processing Unit - the internal part of a computer which controls its operations.
CRT	Cathode Ray Tube - a television-like screen used for display of computer input and output.
CURSOR	a special symbol appearing on video displays which indicates the position of the character to be inserted or deleted.
DATA BASE	a systematic, integrated collection of data files.
DATA BASE MANAGEMENT	a program or collection of programs designed to structure information to facilitate storage and retrieval.
DEBUGGING	finding errors and correcting them.
DIABLO	a Xerox-owned company which manufactures computer peripherals and computer systems, best knows as a supplier of daisywheel printers.

DISK (or DISC)	a circular piece of magnetically coated material on which information can be recorded and stored. Most microcomputers use floppy disks which are flexible, as the name implies. These small floppy disks are also called diskettes. Hard disks, which are not flexible and can hold more information, can be connected to most microcomputers.
DISK DRIVE	a piece of hardware which allows information to be recorded on or retrieved from a disk.
DISKETTE	see DISK.
DOCUMENTATION	written descriptions of software and hardware.
DOS	Disk Operation System - a collection of programs which enables the disk drive to operate effectively.
EBCDIC	Extended Binary Code Decimal Interchange Code. The 8-bit code used by IBM to encode their character set. Based on the original punched card code, it encodes essentially the same characters as ASCII, but in a different numerical order.
EDITOR	a program which facilitates modifications or changes in programming statements and text.
EDITING	making corrections or changes in a program or data.
8086	16-bit microprocessor.
EPROM	Erasable Programmable Read Only Memory. A PROM which can be reused several times. Typically refers to an ultraviolet-erasable PROM which can be erased by exposing it for several minutes to hard ultraviolet light. It is then reprogrammed with a special PROM programmer, and will retain its contents for several years. a UV-type EPROM is recognized by its quartz window over the chip. Other EPROMs may be electrically erasable.
FIRMWARE	a type of software which has been made part of the computer and cannot be accessed by the user, therefore, functioning as though it were hardware.
FLOPPY DISK	see DISK.

FORTH	a programming language characterized by threaded code and postfix, or reverse Polish, notation. It is referred to as Polish BASIC.
FORTRAN	FORmula TRANslator. A programming language developed for scientific applications which is available on some microcomputers.
HARD COPY	computer output which is printed on paper thereby becoming more permanent than the temporary CRT display of output.
HARD DISK	see DISK, WINCHESTER DISK.
HARDWARE	the physical parts of a computer.
HIGH-LEVEL LANGUAGE	any programming language resembling "natural language", with powerful instructions. Examples are FORTRAN, BASIC, APL, ALGOL, COBOL, PL/M. A high-level language (HLL) requires a compiler or an interpreter.
IBM	International Business Machines, the world's largest computer manufacturer.
INITIALIZE	to prepare a disk for storing information.
INPUT	information fed into a computer. Usually input is used together with output.
INTEGRATED CIRCUIT	usually consists of a plastic or ceramic body from 1 to 5 cm in length, from 1 to 2 cm in width, and typically 2 or 3 mm thick, with from 4 to 40 (rarely more) metal leads extending from it. It is usually called an "IC". Inside the body is a chip. The body protects the chip, and the leads allow electrical connection of the chip to other components.
INTERFACE	a circuit that allows other devices to be connected with a computer.
INTERPRETER	a program that allows a computer to directly execute instructions and commands in a computer language that is different from the computer's native language.
I/O	Input/Output - usually used as an adjective describing a device that is used for entering and/or displaying information. Printers, keyboards, disk drives, and CRT's are all I/O devices.

KEYBOARD	a typewriter-like arrangement of keys used to enter letters, numbers and special characters into a computer.
K-KILO	one thousand. Memory size is usually measured in K's of bytes. Symbol for 103. In computer context, K is usually taken to be 210, 102410. A 4K chip is a 4,096 bit chip. A 64K memory is a 65,536 word (or byte) memory.
LANGUAGE	a standardized set of instructions that allows a user to create programs to direct the operations of a computer.
LED	Light Emitting Diode.
LIGHT PEN	a computer peripheral which is used to "read" information from coded labels, into the computer.
LISP	an interpretive LISt Processing language which predominates in the artificial intelligence community.
LOAD	the action of transferring data from a memory location into a register, or a program from the place where it is stored into the place where it is to execute.
LOGO	a computer language developed at MIT specifically for use with children.
LSI	Large Scale Integration.
MACHINE LANGUAGE	a set of binary codes representing the memory configurations which can be directly executed by a processor as instructions.
MAINFRAME	a large computer including the CPU, memory, and peripheral interfaces.
MARC	an acronym for Machine Readable Cataloguing.
MASS STORAGE	the secondary, slower memory used for storing large files or large numbers of small files. Typical mass-storage devices for microcomputer systems are moving-head disks, floppy disks, or cassette tapes.
MEMORY	the circuits which allow a computer to store information. See also RAM and ROM.

MENU	a list of options within a program that allow the user to make selections. Menu-driven software can be more flexible and still be well-suited for a user's specific application.
MICROCOMPUTER	a computer based on a microprocessor.
MICROPROCESSOR	an LSI implementation of a complete processor on a single chip. It is the CPU is of the microcomputer.
MODEM	acronym for MODulator-DEModulator, which, when connected to a terminal, converts machine-readable data into signals for transmission over telecommunications lines to and from the computer. See also ACOUSTIC COUPLER.
MONITOR	a television set that has been adapted to receive signals directly from the computer.
NATIVE LANGUAGE	the language that a computer was built to understand. This language is usually inconvenient to use. Thus, most computers are provided with other languages as well.
NEC	Nipon Electric Corporation
OHIO SCIENTIFIC	a manufacturer of microcomputers as well as other equipment.
ON LINE	a teleprocessing system in which the data enters and is transmitted from the computer to remote terminals via communications facilities.
OPERATING SYSTEM	see OS.
OUTPUT	information coming out of a computer. Usually output is used together with input.
PASCAL	a programming language developed for computer scientists which is often available on microcomputers. More structures than BASIC. Many experienced microcomputer programmers are turning to PASCAL.
PERIPHERAL	a device which is connected to a computer to enhance its I/O capabilities.
PILOT	an authoring language designed for educational applications which is available on many microcomputers.

PL/1	Programming Language 1, a language developed for IBM's 360 series in the mid-1960's. Digital Research produces a version for microprocessors.
PORT	the place where connectors for peripherals are plugged into a computer. It is a physical I/O connection. For 8-bit microprocessors, it usually provides 8 bits of data at a time.
PRINTER	a peripheral which creates hard copy. Most printers use either heat (thermal) or impact to form letters, numbers, punctuation marks, etc.
PROGRAM	a listing of sequenced instructions that instructs a computer to perform specific operations.
PROM	Programmable Read-Only Memory. A ROM that may be altered by the user.
QUME	a manufacturer of computer peripherals.

RAM	Random Access Memory. The circuits which allow information to be stored and retrieved by the user. In microcomputers, RAM is volatile and is therefore erased whenever power is shut off.
REQUEST FOR INFORMATION (RFI)	a series of questions posted to a number of vendors by an organization to ascertain in general terms the capabilities of the vendors in regard to a specific technology or service.
REQUEST FOR PROPOSAL (RFP)	a carefully prepared document that asks vendors to respond, in written proposals to a detailed set of specifications, making known their abilities to meet the specifications, and at what cost.
ROM	Read-Only Memory. The circuits which store information needed by the computer to operate. ROM is not accessible by the user and does not erase when the power goes off. If a microcomputer comes ready to be programmed the language commands (usually for BASIC) are stored in ROM.
SAVE	to store a program for later use. Since RAM is volatile, saving is usually accomplished by recording the program on a disk or cassette.
SCROLL	to move text displayed on a CRT to make room for more text. Scrolling usually refers to up-and-down movement, but can be used to describe side-to-side movement as well.
6502	8-bit microprocessor. Widely used in mass-marketed computer systems, such as, Apple, Pet, and Atari. (MOS Technology)
SOFTWARE	a program or collection of programs that instruct the computer to carry out specific functions.
TERMINAL	a peripheral which allows a user to type in information on a keyboard and display it on a CRT or a printer.
TEXAS INSTRUMENTS	a manufacturer of calculators and microcomputers.
TEXT	information that consists of words and data rather than numbers.

TEXT EDITING	capability of reformating the printed record, such as delete, insert, change strings of words or phrases, etc. See also WORD PROCESSING.
TIME-SHARING	the method of permitting several users to simultaneously interact with a computer system.
TRS-80	a line of computers made by Tandy Corp. (Radio Shack) using the Z80 microprocessor.
TURNKEY SYSTEM	a ready-to-operate system.
USER-FRIENDLY	in easily interactive mode with users.
USER'S GROUP	a collection of people who meet to discuss and share information about computers.
VENDOR	a company that sells computer hardware, software, and/or related services.
VISICALC	a software package marketed by Personal Software, which is designed to aid solution of mathematical problems by allowing the user to set up an "electronic sheet", or grid of rows and columns on the video screen. Locations within the grid can be treated as variables and equations for solving complex problems can be applied to these variables.
VOLATILE STORAGE	storage that loses its contents when power is removed.
WINCHESTER DISK	a hard disk system characterized by very light read/write heads, low head-to-disk clearance, and complete enclosure of the magnetic media in a dust-free environment to achive high information density and fast access-time. See also DISK.
WORD PROCESSING	a program or collection of programs that permit the storage and editing of text. See also TEXT EDITING.
Z-80	8-bit microprocessor. Up-grade of the 8080, contains extra registers and an expanded instruction set. (Zilog)

SURVEY INSTRUMENTATION FOR
ALBERTA PUBLIC LIBRARY DIRECTORS' COUNCIL
NETWORK STUDIES

A PROJECT CARRIED OUT BY

LMG, THE LIBRARY MANAGEMENT GROUP INC.

January 1983

New Westminster, B.C.

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MEMBERS OF THE PROJECT REVIEW COMMITTEE

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    - Cataloguing
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INTRODUCTION

The Alberta Public Library Directors' Council has commissioned The Library Management Group to carry out five studies, related to future library networking in Alberta. These studies are:

1. To find out if smaller libraries should automate some, or all, of their procedures or not, and under what circumstances.

2. To find out comparative costs for cataloguing services.

3. To determine what microcomputer-based systems exist for automating basic library operations.

4. To find out the full operating costs, shared capital costs, and probable data-conversion costs to participants in a shared minicomputer-based library automation system.

5. To determine what is the maximum potential for ILL traffic that Alberta could experience for all types of libraries.

In conjunction with a review of existing documentation, and interviews with library staff in selected public libraries throughout the province, the attached documents are designed to determine the current environment of those libraries, including definition of their present workloads, methods and expected use of computer-based technology.

The documents constitute part of the written instrumentation for these studies. We ask that you review the materials thoroughly before completing them. Because the timelines set by the terms of the project are very tight, it would be helpful if you could return the instruments as quickly as possible. Having participated in such studies ourselves before now, we would like to thank you in advance for your help, and apologise for what we know will seem like an intrusion into your limited time. In extenuation we can only plead that without your assistance, the progress of automated assistance for libraries in Alberta can not proceed very rapidly.

The instruments are arranged in four sections, to meet the objectives of the study as defined by the Council. Unless otherwise stated, all questions refer to 1982, the last complete financial year. Although we have reviewed the documentation in detail with the Project Review Committee, it is possible that some questions may appear ambiguous, or refer to data which you do not regularly collect. If the data are just not available, please just indicate that. If you can make an estimate, that will be helpful, and please note at the side of the question that the answer is an estimate. If you have to make any assumptions to answer a question, which would not be obvious, please state what they are.

For Regional Libraries, it will be helpful if, as far as possible, data both for the system and for the member libraries can be given, where the same function may be carried out and recorded separately at both levels, and the two can be clearly differentiated from each other. It may be useful to complete separate sets of the documents for each level.

Finally, for all respondents, please add any notes or comments that you think may help, and feel free to call either the consultants or any member of the Project Review Committee, if clarification is necessary. Thank you once again for your assistance.

MEMBERS OF THE PROJECT REVIEW COMMITTEE

R. Denham	Parkland Regional Library
P. Forsyth	St. Albert Public Library
P. Galibois	Yellowhead Regional Library
W. Kenny	Fort McMurray Public LIbrary
W. Kurmey	U. Of Alberta
V. Richards	Edmonton Public Library
R. Rowswell	Grant McEwan College

SECTION 1

DEFINITION OF TERMS USED IN THE STUDY

1. Authority Control

A process that creates and maintains relationships among headings in the catalogue, and ensures that variant forms are not inadvertently used.

2. Automated System

A computer-based system which handles the routine chores of library processes. These include circulation (check-in, check-out, reserves, etc.), acquisitions (searching, orders, fund control, payment, etc.), and cataloguing.

3. Bibliographic Utility

An organization that maintains large on-line bibliographic data bases and provides products and services related to these bases to its customers or members.

4. Clerical Staff

For the purposes of this study, clerical staff includes all staff who are not employed as professional librarians, or as technicians. This may include, in some libraries, staff such as accountants or personnel dept. staff who, in other senses would be considered as professional employees.

5. FTE

Full time equivalent of something, often staff. For example, four people who each work one third of the time in acquisitions, would be counted as one and a third FTE in that function. In a number of questions, you are asked to give both the total number of employees doing some work, even for only part of their time, on a specific function, and also for the total FTE. The latter means that you should count up all the hours, as closely as you can, that everybody in the employee grouping referred to (e.g. professional, or clerical) spends on the function in an average week, and divide it by the total regular number of paid hours that staff group works in a standard week. The answer will be the FTE.

6. Jobber

A wholesale bookseller who stocks many copies of various monograph titles issued by different publishers, and who supplies them to libraries.

7. Monograph

A separate bibliographic item. I.e. Any publication which is not a serial, such as a book, but also including films, records, etc.

8. Products

The tangible results of manual or automated systems, including catalogue cards, magnetic tapes, bar code labels, order forms, computer output microfiche (COM), book catalogues, etc.

9. Professional Employees

Employees possessing a professional library qualification, rcognised and compensated accordingly by the library.

10. Serial

Any publication issued in successive parts, appearing at intervals, usually regular ones, and intended to be continued indefinitely. (e.g. periodical, newspaper, continuation, etc.)

11. Subscription Agent

A wholesale vendor of serials, who often handles invoicing and claims for the customer libraries.

12. Technician

A library employee possessing the status of, and paid as a para-professional, and usually, though not necessarily, holding a diploma or equivalent from a library technician pogramme.

13. Volunteer

A person working in the library on a regular basis, but without payment, other than a nominal sum.

SECTION 2

FINANCIAL AND STATISTICAL

NAME OF LIBRARY____

ADDRESS ____

____

TELEPHONE ______________ TELEX ______________

RESPONDENTS ____

____

DESCRIPTION OF OPERATING SITES (Please list each one, giving type. E.g. Branch headquarters, shopfront outlet, mobile, etc., and describing each major centre situated there. E.g. Acquisitions dept., reference dept. circulation outlet, etc.

____

____

____

____

____

____

____

____

____

DETAILS OF KINDS AND SIZE OF COLLECTIONS
(E.g. Children's; Various audio-visual: Canadiana: Ethnic, etc.)

SIZE OF POPULATION SERVED

OPERATING AND CAPITAL BUDGETS

Please provide two copies each of the operating budget for 1982, and of the budget request or budget plan for 1983, or equivalent financial periods in your library.

ANNUAL REPORTS

Please provide two copies each of the most recent general library annual report, and yearly statistical report.

OTHER DOCUMENTS

Please list and provide two copies of any other documents
a. having relevance to automated systems in your library.
b. having relevance to costing of any functions in your library.

SECTION 3

GENERAL INFORMATION

COLLECTIVE AGREEMENTS

Please list and provide two copies of all collective agreements or other documents relating to conditions of employment (salary grids, etc), for all employee groups. This information is valuable in estimating costs of manual versus automated functions.

AUTOMATED SYSTEMS

Please describe any automated library system you presently use, indicating hardware, software, and basis of access. (E.g. Owned, leased or shared equipment, contractual agreement with commercial company, etc.)

Name of System	Hardware Configuration	Software	Type of Access

Please list and describe any other computing equipment presently possessed by the library. (E.g. Apple, TRS80, IBM PC, etc.)

Please list and describe any other computing equipment to which the library does or could have access. (E.g. Municipal IBM 370)

USE OF VOLUNTEERS

Subsequent questions do not specifically ask about time spent on functions by volunteers. Please insert this information where approprate, only if volunteers asre utilized extensively for some functional area, and clearly identify the information as relating to volunteers. Here, please give the total number of volunteers normally working in the library, and the FTE.

Total ----- FTE -----

REGULAR WORK WEEK

Please state the number of hours worked in a standard (not modified) work week for each group of employees.

Professional Staff -----

Technicians -----

Clerical Staff -----

Other -----

FRINGE BENEFITS

Wherever a question in this documentation refers to salaries, please state the total gross salaries, or the salary ranges of the groups involved, excluding fringe benefits. (N.B. We do not require salary details for individual staff members.) Here please state the approximate dollar value of total fringe benefits for each employee group, as a percentage of total compensation. E.g. If the total annual gross salary range for clerical staff is $15 -$20,000, and the yearly dollar value of fringe benefits for the group, including vacation, medical/dental benefits, insurance, etc. is $1500 -$2000, then the appropriate figure would be 10%.

Professional Staff -----

Technicians -----

Clerical Staff -----

Other -----

SECTION 4.1

INVENTORY

CIRCULATION

1. What was the total circulation for the last two years, and the predicted figure for this year.

	1981	1982	1983
books			
periodicals			
others (please list)			
----------------------------	-----	-----	-----
----------------------------	-----	-----	-----
----------------------------	-----	-----	-----

2. Number of circulation transactions from each separate outlet, last complete year

---------------------------- ----- ----- -----

---------------------------- ----- ----- -----

---------------------------- ----- ----- -----

3. How many of your staff do work on circulation at each outlet? E.g. Separate branch, or separate counter in one building.

Name of outlet	Total employees	FTE'S
A. ----------------		
Professional staff	----------	--------
Technicians	----------	--------
Clerical staff	----------	--------
B. ----------------		
Professional staff	----------	--------
Technicians	----------	--------
Clerical staff	----------	--------
C. ----------------		
Professional staff	----------	--------
Technicians	----------	--------
Clerical staff	----------	--------

4. What was the total annual salary budget in 1982, for circulation staff, if this is defined as a separate budget figure?

Professional staff	----------	--------
Technicians	----------	--------
Clerical staff	----------	--------

5. How far are your two farthest service outlets from each other? ----------

6. How many requests to borrow an item (total of satisfied and unsatisfied) were processed last year? (N. B. In regional libraries, include both same branch and intra branch requests, but not ILL with other libraries) ----------

7. How many overdue and fines notices were mailed to borrowers last year? ----------

8. Does your library restrict services to delinquent borrowers? ----------

9. How many renewals were processed last year? ----------

10. Are renewals first checked for request status? ----------

11. Are there any special circulation service charges, such as request or renewal fees? Please list.

----

12. How many different circulation files do you maintain? Please list. (E.g. Audio-visual, Childrens, Overdue, etc.)

----

13. What circulation statistics do you keep? Please list.

----

14. What circulation system do you now use? (E.g. Manual, Recordak, CLSI) ----------

15. What are its main advantages and disadvantages?

16. What do you expect to be the main difficulties in implementing an automated system?

17. On a scale rising from one to ten, where one is lowest and ten is highest, for the introduction of automated systems, where would you rate a circulation system? __________

SECTION 4.2

INVENTORY

Acquisitions (Monographs)

1. What was the total number of titles searched, ordered and received last year?

Type of material (E.g. books, records)	Titles Searched	Titles Ordered	Titles Received
------------------	------	------	------
------------------	------	------	------
------------------	------	------	------
------------------	------	------	------
------------------	------	------	------
------------------	------	------	------

2. What was the total number of items searched, ordered and received last year?

Type of material (E.g. books, records)	Items Searched	Items Ordered	Items Received
------------------	------	------	------
------------------	------	------	------
------------------	------	------	------
------------------	------	------	------
------------------	------	------	------
------------------	------	------	------

3. How many employees perform acquisitions (monographs - see DEFINITIONS) duties, whether full or part time?

	Total Number	FTE'S
Professional Staff	------------	------
Technicians	------------	------
Clerical Staff	------------	------

4. What was the total annual acquisitions (monographs) salary budget in 1982

Professional staff ------------

Technicians ------------

Clerical staff ------------

5. Do you place acquisitions orders

directly to suppliers? -------------

through city or other purchasing unit? -------------

6. Do you order items

throughout the year? -------------

on a batch basis? -------------

7. If batch

how often? -------------

average batch size

in titles -------------

in items -------------

8. Which of these acquisitions files do you keep?

	On order	Received	In-Process
by main entry heading	------	------	------
by title	------	------	------
by order number	------	------	------
by supplier	------	------	------

9. Do you place orders

	Number annually
with a variety of jobbers?	------
with one jobber only?	------
directly with publishers/agents?	------
with local book-stores?	------

10. Do you maintain your own financial records for acquisitions?

commitments only -------

expenditures only -------

11. Do you

report all commitments and expenditures to a central office where financial records are maintained? -------

authorize payments of invoices from the library? -------

issue cheques from the library? -------

12. Over how many separate acquisitions fund accounts do you have control? -------

13. How many separate accounts do you manage or keep track of, even if you don't exactly control them? -------

14. Is pre-order searching to locate catalogue copy part of your acquisitions procedure? -------

15. What regular statistics are kept of your acquisitions activity (E.g. Number of titles ordered, number received, number outstanding, etc.)

monthly? -------

annually? -------

16. What are the main advantages and disadvantages of your present acquisitions system?

17. What do you expect to be the main difficulties in implementing an automated system?

18. On a scale rising from one to ten, where one is lowest and ten is highest, for the introduction of automated systems, where would you rate an acquisitions system?

SECTION 4.3

INVENTORY

ACQUISITIONS (Serials)

1. How many serial publications do you now receive regularly on

subscription (excluding standing orders) _______

standing order _______

2. Please describe your serials receiving procedures. (E.g. central Kardex)

3. How many employees perform acquisitions (serials) duties, whether full or part time?

	Total Number	FTE'S
Professional Staff	______	______
Technicians	______	______
Clerical Staff	______	______

4. Total annual acquisitions (serials) salary budget in 1982

Professional staff ----------

Technicians ----------

Clerical staff ----------

5. Do you place serials orders

directly to publishers? ----------

through serials agent? ----------

6. Which of these serials files do you keep?

order information file ----------

kardex/check-in file ----------

binding file ----------

publisher/jobber file ----------

separate claim file ----------

other (please describe) ----------

7. Does the check-in record also serve as the permanent holdings record? ----------

8. Do cataloguing decisions appear in the check-in record? ----------

9. What records are maintained for material for which standing orders are not accepted? ----------

10. How many titles do you bind yearly? ----------

11. How many items do you bind yearly? ----------

12. What categories of serials appear in your public catalogue?

----

13. Describe any serials lists you produce

----

14. What serials statistics do you keep?

----

15. What are the main advantages and disadvantages of the present system of managing serials?

16. What do you expect to be the main difficulties in implementing an automated system?

16. On a scale rising from one to ten, where one is lowest and ten is highest, for the introduction of automated systems, where would you rate a serials system?

SECTION 4.4

INVENTORY

CATALOGUING

N. B. In this section we are including processing with cataloguing as a joint activity. However, if you are able to distinguish between the two in some or all respects, please do so, giving both sets of information and clearly distinguishing between the two. Otherwise just include the two together without distinction.

1. How many employees perform cataloguing duties, whether full or part time?

	Total Number	FTE'S
Professional Staff	---------	---------
Technicians	---------	---------
Clerical Staff	---------	---------

2. What was the total annual cataloguing salary budget in 1982

Professional staff ---------

Technicians ---------

Clerical staff ---------

3. What was the total number of materials catalogued in 1982?

Type of material (E.g. monographs, films)	Number of titles	Number of items
----------------	---------	---------
----------------	---------	---------
----------------	---------	---------
----------------	---------	---------
----------------	---------	---------

4. Please describe any cataloguing backlog.

----

5. Is the backlog a problem and
is it increasing?

----

6. Please describe the format of existing catalogue(s)
(please supply samples of each)

Card	----------------
Book	----------------
Other	----------------
	----------------

7. Do you keep separate files
for special materials?

audio-visual	----------------
maps	----------------
periodicals	----------------
other	----------------
	----------------

8. If you maintain a union catalogue for more than one location, please describe, and state whether it gives locations.

----

9. Size of existing catalogue

number of catalogue records ---------------

number of catalogue cards ---------------

number of records added yearly ---------------

number of cards filed yearly ---------------

floor space occupied ---------------

10. Please list cataloguing languages other than English

----

11. Source of cataloguing copy for manual cataloguing. Please give number of titles for which cataloguing copy is produced.

SOURCE	NUMBER OF TITLES
Original (from book)	---------------
NUC	---------------
Canadiana	---------------
Other (please specify)	---------------

12. Number of titles for which card sets are purchased from outside suppliers, yearly.

SOURCE	NUMBER OF SETS
----------------	----------------
----------------	----------------
----------------	----------------

13. How many added copies are catalogued each year? ----------------

14. If you duplicate cards in house, how many yearly? ----------------

15. Do you add headings to supplied card sets? ----------------

16. Do you use tick tracings? ----------------

17. If your catalogue is not on cards, how often do you produce a new

cumulation? ----------------

supplement? ----------------

18. How long does an average item spend in cataloguing/processing? ----------------

19. Number of titles withdrawn yearly ----------------

20. Number of catalogue records altered yearly (excluding locations) ----------------

21. Number of location records altered yearly ----------------

22. Rules/standards followed for

main and added entry headings	----------------
descriptive cataloguing	----------------
classification	----------------
subject headings	----------------
filing rules used	----------------
local variants followed	----------------
name authority	----------------
subject authority	----------------

23. How do you implement catalogue changes resulting from updates in the authorities (such as Sears Subject Headings) you follow.

----

24. What cataloguing statistics do you keep?

----

25. Do you use any fully or partially automated system? If so, please describe.

26. What do you expect to be the main difficulties in implementing an automated cataloguing system?

27. On a scale rising from one to ten, where one is lowest and ten is highest, for the introduction of automated systems, where would you rate a cataloguing system?

SECTION 4.5

INVENTORY

INTER LIBRARY LOAN

1. Please describe your use of information on the holdings of other libraries. (E.g. ILL only; acquisitions decisions, cataloguing aids, etc.)

2. How many ILL items did you borrow last year (i.e. outside your own library or system?) ----------------

3. How many ILL items did you lend last year? (i.e. outside your own library or system?) ----------------

4. Which libraries are your main sources of ILL?

----

5. Which are the main libraries that borrow ILL's from you?

----

6. How many employees perform ILL duties,
whether full or part time?

	Total Number	FTE'S
Professional Staff	---------	---------
Technicians	---------	---------
Clerical Staff	---------	---------

7. What was the total annual ILL salary budget, if any, in 1982?

Professional staff	---------
Technicians	---------
Clerical staff	---------

8. What was the total annual ILL budget in 1982 (other than any salaries involved), or actual expenditures, if different?

----

9. Please describe any commitments you have made to resource sharing, and state which services or resources are shared. (Please send two copies of any written agreements).

----

10. ILL can be facilitated through the use of automated techniques. How important do you consider ILL to be in warranting such systems? Please comment, and rate on a scale rising from one to ten, where one is low, and ten is high.

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Volume

2

5

COSTS AND BENEFITS OF AUTOMATING LIBRARY PROCESSES IN SMALL AND MEDIUM-SIZED LIBRARIES

STUDIES INITIATED BY THE ALBERTA PUBLIC LIBRARY DIRECTORS'
COUNCIL AND JOINTLY FUNDED BY ALBERTA ADVANCED EDUCATION,
ALBERTA CULTURE AND ALBERTA EDUCATION

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VOLUME 2

COSTS AND BENEFITS OF AUTOMATING LIBRARY PROCESSES IN SMALL AND MEDIUM-SIZED LIBRARIES

VOLUME 2:

MICROCOMPUTERS FOR AUTOMATING BASIC LIBRARY OPERATIONS

MINICOMPUTER-BASED SYSTEMS FOR LIBRARY AUTOMATION

COMPARATIVE COSTS FOR CATALOGUING SERVICES

POTENTIAL FUTURE INTERLIBRARY LOAN TRAFFIC AMONG ALBERTA LIBRARIES

MICRO COMPUTERS
FOR AUTOMATING
BASIC LIBRARY OPERATIONS

A study for

the

Alberta Public Library Directors' Council

by

Dr. David R. Williams

and

Derek R. Francis

LMG The Library Management Group, Inc.

New Westminster, B.C.

March 1983

EXECUTIVE OVERVIEW

This study investigated the availability of micro computer based systems for automation of library functions. Thirteen possible systems were identified and reviewed. They ranged from very inexpensive systems, which could be implemented for less than $10,000, to systems costing over $100,000.

Systems were reviewed for functions provided, capacity, hardware requirements, price, product generation, maintenance and installation, communications capabilities and other matters. Several systems appear promising for Alberta libraries.

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Introduction

The advent of the micro computer began only about five years ago. Until that time, computers were either mainframes, such as the large IBM, Honeywell, Xerox, etc. installations, or mini computers, like Hewlett Packard's 3000 series. Both minis and mainframes were costly beyond the ability of small organizations, or certainly of individuals to purchase. The past few years, however, have seen a dramatic market penetration by new, cheap, versatile micro computers, which are affordable by almost anyone. Indeed, micro computers have been the most rapidly evolving products in the fast moving data processing industry. Many computer specialists feel that the real micro computer revolution happened in 1977, when the Radio Shack TRS-80, Commodore Pet, and the Apple II were introduced to the market place. Each of these machines has now been replaced by at least one, and in some cases two or three later versions, with successively greater capabilities. There are now between fifty and one hundred micro computer vendors, offering more than 150 models. Many of these, however, use the same microprocessor for the central CPU, but differ greatly in their operating systems, and peripherals. Some widely known and used micros now include the IBM Personal Computer, the DEC personal computer trio, the Apple II, II+, IIE, III and LISA, (and soon, the Macintosh!), the Commodore PET, the Commodore 64, the TRS 80 in its various models, the Sinclair, the Osborne, the Kaypro, the Texas Instruments line, the Onyx (a linked multiprocessor machine), the Japanese Toshiba and the Heath computer kit. Timex, too, is bringing one out.

One of the most striking developments has been the increase in memory capacity. Early models had memories in the area of 8 to 16K, while today we are seeing 256K at ever reducing prices. Fortune Systems has recently made available a micro with RAM expandable to one megabyte. It is this expansion of memory, together with the miniaturization of the CPU architecture, that has made micros particularly attractive for library (and many other) purposes. Libraries typically have very high memory storage requirements.

There are not as yet very many widely used micro computer based systems for libraries. At the same time, across the continent, there are hundreds, if not thousands of such systems which have been locally developed, and some of which are gradually achieving a wider fame. Because the TRS 80 was the first widely available micro, many of these local systems were written to run on it. As the Apple phenomenon developed, so programmes for libraries became available on Apple. Three of the systems reviewed in this study can be run, not necessarily exclusively, on Apple.

One reason for this situation is that until the last three years, micro computers have not had the capacity to mount programs which would be appropriate for any except small libraries. This was due to their restricted memory capacities. Now, however, micros are rapidly becoming equivalent in many respects to tiny minis, and their memories and related capacities are greatly increasing. Some systems which were formerly mounted on mini computers are being adapted to run on micros, and new systems are being developed for the micros themselves.

An example of the former is CLSI, which is developing a micro based system, termed LIBS 100 System 23. An example of the second is Richmond Micro Software, a system originally written on Apple for school libraries, and now being modified for public libraries.

The very terms "micro" and "mini" are now beginning to overlap, just as the distinction between minis and mainframes is blurring. MINIMARC, for example, has described itself in its literature as a minicomputer and a mainframe. But in our opinion, it could just as well be called a micro, albeit a powerful one, and is included here for that reason. The big advantage that micro based systems will have lies in the very large cost reductions which they permit. They make automated systems possible for even the smallest library. The Richmond system, for example, could be mounted for about $5000.

It seems probable that even the rapid developments of the past few years will be exceeded by that of the next decade. The introduction of Applications Generator Programming Languages, made possible by large memories and powerful microprocessors, the development of networking through cheap and versatile interfaces, increases in the number of terminals that can be connected, and particularly the invention of microprocessor controlled peripherals seems certain to cause a virtual explosion in the use of micros, in libraries as elsewhere. Advantages of micros in general include the low initial investment, little installation support required, low space usage, lack of special environmental requirements, high portability, and high level of "user friendliness", a jargon term used to indicate that little special training is required to use and understand the system. Although micros are designed for normal operating environments, some libraries have reported some problems with static electricity, requiring the use of anti-static mats or humidifiers. Because most micros lack special cable to provide protection against power surges, this too may sometimes prove a problem.

To date, most library applications on micro have been single function, whether a circulation system, an acquisitions module, or a cataloguing tool, etc. Surprisingly few smaller Canadian libraries as yet have utilized them for the many other non-library specific functions, although in larger libraries, and in U.S. libraries in general this is less true. Examples of such uses include Word Processing, Accounts Receivable, Accounts Payable, General Ledger, Payroll Applications, Data Base Search, Coin Operated Public Use, Generalized Inventory Control, Personnel Records Applications, Computer Assisted Instruction, to name only some.

As libraries turn more to micros, it seems probable that the single function application will be succeeded by integrated systems of the type now found on minis and mainframes, and this process is in fact in train at some of the vendors reviewed in this study. Such integration can be provided, either by mounting all functions on the micro, and making them compatible, or by using the micro to connect up various independent limited funcion systems running on other computers. Apart from the central functions of cataloguing, circulation, acquisitions and serials, the development of interface capabilities will permit their use for inter library loan, electronic messaging, data base searching, Telidon-type access, various kinds of networking and generalized data base management in the library context. Another important use will come as intelligent peripherals, which can be connected to remote mainframes, for a variety of purposes. An example already extant is found in the Gaylord Apple system, where an Apple II is connected to the Gaylord mainframe installation.

An important problem till now has been the lack of adequate data base management systems (DBMS). DBMS software makes it possible to locate a record with any one of several access keys, without the necessity of creating a separate record for each access key. This is obviously fundamental for libraries, where records commonly have six to ten, or even more, access points to the same information. Until recently, the memory requirements of DBMS packages were too large to be accomodated by most micros.

Another limitation is the amount of space in the micro (ROM, or CORE) in which a programme can be stored in order to run. A programme to run on a micro has had to be very efficient to fit into this limited space. Again, however, like RAM, this type of memory is being expanded. As a result of this, many vendors of mini based systems, can be expected to rewrite their programmes to run on a micro. CLSI is only an early example. And the PDP/11 itself is being restructured as a micro.

In addition, a micro has typically had a lower processing speed than minis and mainframes. One must look not only at the capacity to store files, but also at whether the planned transaction rate can be achieved within the response time requirements. This too is rapidly improving.

The lack of commercially available software for libraries has reduced the usefulness of micros until recently. The very success of the technology has contributed to this scarcity, because the hardware has been developing so swiftly, it has inhibited the writing of the software. The best software may well take place in a relatively static environment. The problem has been exacerbated by the lack of a common standard protocol for many applications, such as communications, file structure, data bus systems, field blocking etc. In addition, there has been a lack of sharing of software among libraries. All of these factors are gradually being attacked, with the result that now is likely to be a productive time for smaller libraries to examine the possible utility of micros in their system.

This study reviews six specific systems, and outlines their basic functioning. As far as possible, basic data on hardware requirements, prices, future developments, and relation to other computer developments have been included. Prices quoted are the latest available. Since many manufacturers specifically reserve the right to change prices without warning, and in any event rapid price changes, especially for hardware, are characteristic of the field, they should always be checked with the vendor agent. A summary section will include some discussion of the advantages and disadvantages of micros in various situations.

RICHMOND MICRO SOFTWARE

This British Columbia company is located in Richmond, close to Vancouver. It has recently become associated with Sidney Development Corporation, a high profile software promotion company, in order to market a range of programs designed to run on an Apple microcomputer, which together constitute a complete automated library system. The designer of these programs was a school librarian, and the programs were originally written for his own library.

The Apple II, for which they were designed is one of the leading micro computers. It can have up to 64K memory in RAM, and is programmed in two versions of BASIC termed Applesoft and Integer Basic. Other languages which can be used include PASCAL and FORTRAN. The Apple can use either floppy disk drives or rigid disk. Several modems can be connected to it, for interfaces with other systems, and a variety of other peripherals can also be used.

The Richmond Micro Software package was designed primarily with the needs of school libraries in mind, but is useful for small libraries in general, and could be used in a branch system in conjunction with a larger general library computer system. The vendor claims that the system is operational in nearly 100 school, college and public libraries in several countries.

On line circulation.

This module is designed for a basic scanning process, analagous to the Universal Product Code system in use in many stores. It uses a Barwand light pen, capable of reading label code. Bar coded, self adhesive labels can be produced using an impact printer, or may be purchased pre-printed from the manufacturers of the pen. The labels are then applied to the items in a library collection. User cards also have separately coded labels applied. On check out, the pen is passed over both cards, creating the loan transaction. Upon return, the program allows the transaction to be deleted by scanning the book label only. Overdue lists are automatically generated each day, and delinquents are prevented from borrowing by the fact that the computer will not allow the pen to proceed with the transaction.

The system will handle up to 65,000 items, 2650 general borrowers having 15 items each, 200 special clients (originally teachers) up to 125 items each, 100 holds and an unlimited reserve collection, with anything from one day to one year loan periods, adjustable for each transaction. If the library already possesses an Apple microcomputer, the cost would be U.S.$200 for the pen, (not available from Richmond MicroSoftware, by the way), and $500 for the program. An Apple II Plus, with two floppy disk drives and printer could cost less than $5000. To add various peripherals, and options might run the price up to something approaching $10,000.

The light pen can also be used for inventory purposes. The computer can be wheeled up and down the shelves on a trolley, running the pen across the labels of the books on the shelves. At the end of the process, a list is generated of all missing items, listed by unique ID.

Ordering System.

After selection of materials, the order clerk sits at the computer and types in author, title, publisher, price and any other information required. The computer generates an order by supplier, ready for authorization. This form is an 8 1/2 by 11 sheet, personalizable to the individual library. Upon receipt, Dewey class number and subject headings are added to the record, and the computer transfers the record to a permanent diskette which contains the appropriate range of Dewey numbers. The catalog card and label printer system is used with this record. The system retails for U.S. $125, and includes "Consideration", "Order" and "On-order" files.

Cataloguing System.

This programme is used for materials which are already held in the library. It records call number, author, title and descriptive cataloguing information, collation, ISBN/LCCN, four subject headings and accession number. Each field can be updated individually, and items in a given Dewey range can be printed, provided the information is stored by Dewey ranges on each diskette. There is no practical way, however, to do a subject search, as the amount of information described permits only about 250 titles per diskette. Cost of the system is U.S. $125.

Catalogue Card and Label Printer System.

This programme takes the information stored for the item by the cataloguing system and produces a set of fully headed catalogue cards, on the impact printer. When the cards have been run through the printer, label stock is set up, and the spine, book pocket and book card labels are then printed for each record. Over 100 card sets, at approximately five cards per set, can be printed in two hours. Time is somewhat less for label sets.

The programme is available for U.S. $100. If purchased with the Cataloguing system, there is a reduction of $25.

Serials Control.

This programme provides automated control of the serials collection. Information stored on each serial includes: title, authoring body, supplier, classification number, commencement date, renewal date, number of copies, frequency (22 possibilities), comment line, holdings and missing issues. The following lists can be produced on screen or in hard copy:

titles
classified list
holdings and missing issues of all or selected titles
overdue issues for claims
claims forms

Up to 200 titles per diskette and unlimited diskettes can be used. As many as 500 missing issues per title may be stored.

Prices

	U.S.$
Circulation system	
software	500
light pen	200
Ordering system	125
Cataloguing system	125
Catalogue card and label printer system	100
Serials control system	125
Updated versions	30
All systems package	900

N.B. If the Cataloguing system and Catalogue card and label printer systems are purchased together, a discount of $25 applies.

Future Developments

The present system was developed primarily for school libraries. The company is now actively preparing a revision aimed at public libraries, slated for introduction by Christmas, 1983. It is planned to be an integrated library system, with ordering, serials control, cataloguing and circulation capabilities. The hardware will consist of six to ten microcomputers The company plans to make the system available on other micro computers, but probably Apples will be the first. The linked micros will be networked to a five, ten or twenty megabyte hard disk drive. A possible configuration for these would allocate two for circulation, two for cataloguing and ordering, and up to six for an on line catalogue. We expect that with the proprietary hard disk operating system the company has developed, the system will be capable of handling from 10 to 40,000 titles, depending on the capacity of the disk. The record will be fairly detailed, consisting of author, title, call number, and subject headings. The software should include an interface which will permit the loading of UTLAS or other machine readable records from tape. An introductory price of two to three thousand dollars is presently planned for the software. The system will have a modem capability, permitting like systems to communicate.

General Comments

All of the programs use an interchangeable record structure. The company undertakes to replace all master diskettes. The systems are copyrighted, and the diskettes are protected against unauthorised copying. Special prices are available for quantity purchases.

The company undertakes to supply clients with subsequent updates for a heavily discounted price (approximately 25% of purchase price), and backup copies are supplied with purchase. A discount of $75.00 applies, if all five programmes are purchased. This company is presently developing a media booking and circulation system, and on an hourly reserve collection system.

The advantages of this system to a small library are considerable. We are not aware of any other generally available integrated system which is available at comparative prices. On the other hand, in its present version, there is no doubt that it is somewhat limited in scope and flexibility. For medium and larger sized libraries, perhaps its utility would best be in branch or departmental applications. At the prices quoted, Richmond Micro Software's product seems well worth looking at by small libraries.

MINIMARC

This system is sold by Library Systems and Services Inc., of Rockville, Maryland. The company was founded in 1982, at which time it purchased the rights to MINIMARC from Informatics Inc. However, the principals in both companies seem to be the same, and the present head of LSS, Frank Pezzanite, was the original developer of MINIMARC, and still appears to be the driving force. The company also contracts for consulting projects and other services.

The system is a standalone unit, which consists of a CPU, a floppy diskette drive, a CRT display and keyboard and a printer. It is marketed as a cataloguing resource and utility system, providing LC catalogue records in machine readable form, as they are distributed. The data base is presently composed of a library of floppy diskettes, containing approximately 2,000,000 MARC records. The diskette data base is updated weekly, concurrently with the MARC subscription service. In effect, a subscription to MINIMARC replaces a subscription to LC MARC. There is presently some discussion of making the data base available on video disk.

The system is more akin to a mini than to a true micro. The hardware is supplied by the company, using an LSI 220 processor and Alpha 16 architecture. It is a 16 bit system, which is considerably more powerful and speedy than the older 8 bit based machines. The system uses Pertek 8" floppy diskkete drives.

The vendor presently supports fifty installations in the United States and one in Canada: Kitchener Public Library. Interestingly, one user of MINIMARC is Professional Media Service Corporation (PMSC). This company, formerly a division of Brodart, is a wholesaler of records and cassettes, which can be purchased from it, together with cataloguing copy, derived through the MINIMARC data base. It is claimed that a typical installation can process up to 25,000 titles annually, and the vendor suggests that most libraries find that cost justification for installation of the system is reached with a throughput of 5000 titles annually.

A new version of MINIMARC (3.0) is due to be released in 1983. It will incorporate MARC tags commonly used for serials records, an increased maximum number of entries per record, specification of number of main entry cards, optional omission of tracings from continuation cards. The new labels programme will include tags to permit specification of copy,accession and volume numbers. An option has been added to permit the author field to be truncated by a subfield code. Although the vendor claims that additional options in the print programmes simplify customization of these programmes, LSSI will send a staff member to make these custom changes whenever that is considered necessary.

Recently an Advisory Board was formed for the system. Members are selected by LSS, to represent users. Its purpose is to provide feedback, and input to future developments. Members of the Board have also apparently agreed to act as contacts between LSS and potential customers, as well as a channel for complaints/comments from current users. Present members of the Board are:

Ann Kelver, Director
Arapahoe Regional Library District
Colorado

James B. Nelson, Director
Cabell County Public Library
West Virginia

Barabara DeYoung, Director
Lawrence Public Library
Maine

Kenneth Jones, Director
Instructional Media Services
Orange County Public Schools
Florida

Annalee M. Bundy, Director
Providence Public Library
Rhode Island

Alfred Freund, Director
Ramapo Catskill Library System
New York

Another interesting development is an agreement between LSS and CAPCON, which was concluded in 1982. CAPCON is a library systems co-operative in the mid-Atlantic area. It includes academic, law and other private libraries. LSS receives all CAPCON tapes from OCLC quarterly, verifies, copies and stores them. It then provides extraction of records from the tapes, tape merging, duplicate record compression, authority control, generation of reports, heading reconciliation, and fiche, film or book catalogues, in dictionary, main entry, author/title, subject, KWIC/KWOC, shelflist or other sequences.

There is now available a large print COM index (!) to MINIMARC. LSS is planning to prepare a video taped orientation session, which can be used by new clients for training staff.

LSS is considering the addition of a number of new features. These include modules for bibliography preparation, accounting systems, acquisitions and inventory control. However, there is no indication when these might be available.

Cataloguing

The MINIMARC system is really only semi-automated. The process is one of comparing the physical book or some printed description thereof with data in MINIMARC. The appropriate floppy diskette is selected from a colour keyed and numbered library of diskettes. A microfilm index to these diskettes is also provided. This index is searched by author or title to provide a disk identification number, and an LC card number. The appropriate diskette is then located and booted, and the LCCN is keyed in to determine whether cataloguing data for the book in hand are on the diskette. If it is, the record appears on screen. When copy is located, it can be modified to suit local requirements, and stored as part of the library's own data base. A library can design its own profile, including an "exclusion" feature which permits designation of portions of the MARC record as not pertinent to the libary's needs. These revisions are then automatically made to any record selected. There are three options for in library storage. Magnetic tape or 8" floppies may be used. Alternatively a rigid disk can be used, with up to 132 MB storage capacity.

Product Generation

Complete headed card sets, with unique local call numbers and headings can be produced, together with processing labels and pockets. The full ALA character set is supported. Card production can be run in background mode, or with the machine unattended. Edit lists for proofing purposes can also be produced. As well, the machine record can be used to generate a book or microform catalogue. MINIMARC provides a free service, whereby a client library may send its diskettes together with blank magnetic tape to MINIMARC, for transfer of records to the tape. This tape can then be used by any product vendor to produce a book or microform catalogue. Original records can be input to the system also, using a blank on screen cataloguing layout, containing tags, indicators and subfield codes, which permit the creation of a MARC like record.

Interfaces

One of the intended uses of MINIMARC is to act as an integrating centre for various other automated systems in the library. Furthermore, the system has been linked to a number of other automated systems, to permit the transfer of records. These include CLSI LIBS 100, GEAC, Maggie's Place, Dataphase and the Virginia Technical Library System (which runs on an HP 3000). Links have also been established with OCLC and RLIN, to permit extended searching.

Prices

An average installation is quoted at U.S.$35,000 for hardware and software. This would include the central CPU, one terminal, three floppy disk drives, and a printer. The data base costs an extra U.S.$13,500. This data base includes MARC and CANMARC records. Monthly subscription to both the microfilm index and the MARC record data base costs U.S.$385. Maintenance is provided by the vendor, and is costed at U.S. $440 -$620 monthly, depending on the complexity of the system and the distance from Rockville, Maryland. The system is also available through a lease plan.

By our calculations, for a library cataloguing 5,000 titles annually, per title costs would run about $4.00 (Canadian), to cover the MARC update subscription, maintenance, and equipment amortization. This compares with a cost from UTLAS of $5 - $6.00, on average.

General Comments

MINIMARC is described by the company as "a bibliographic control centre". It was developed as an integrating factor for other automated systems. Thus for a library which had installed several independent packages, cataloguing, circulation and acquisitions, perhaps, MINIMARC could act as a central source of copy, transferred on line to each of the other modules as required. How valid this assumption is today, is difficult to assess. Integration of systems has been developing rapidly. Yet it is still quite possible to buy independent systems, and undoubtedly libraries do so. Perhaps this is particularly likely to be true of smaller libraries, reluctant to invest in the expense of a large fully integrated system. On the other hand, there are a number of relatively inexpensive systems coming along. And even in an integrated system MINIMARC is still useful as a method of getting machine readable records into the system. One of its major advantages over bibliographic utilities such as UTLAS is in the avoidance of communications charges

MINIMARC certainly does provide one answer to the problem of how to get machine readable cataloguing data into a system, though not particularly cheaply. The system would also be useful for an in house retrospective conversion project. The system can also be used to generate and transfer records for use in an automated circulation system. An advantage for Canadian libraries is that CANMARC is included. The provision of CANMARC sets MINIMARC apart from many other U.S. vendors. The extension of the data base appears to be a natural future development for the system.

The company has expressed the view that for libraries in Alberta, maintenance might be somewhat of a problem, considering its distance from Rockville. Possibly some extra cost provision would be required. The company has already discussed with the Advisory Board, the possibility of travel charge differentials for different parts of the country. In the maintenance connection, there is also the possibility that discounts will be available for advance payment for maintenance contracts. To date there is no software maintenance programme, but this appears likely to develop, because of the frequent modifications to MINIMARC.

RINGGOLD NONESUCH

Ringgold Management Systems, Inc. is a consulting company, working out of Portland, Oregon. Its principal, Dr. R. Shoffner, ws at one time associated with Richard Abel. The company was established in 1974, and was closely involved with the developemnt of BCUC. It first began marketing automated systems in the late 1980's.

Ringgold sells an acquisition system on a Wang 2200 series mini computer. It also markets a circulation package for micros. The system consists of a number of microprocessors linked to a large disk storage unit to form a distributed network. The system can handle many circulation stations. Ringgold hopes to integrate the acquisitions and circulation systems, and has quoted on such a package (at U.S.$25,000), but no sales have been made as yet. The circulation package can also run on minicomputer, and Ringgold has quoted for such a system. Again no implementation has yet been accomplished.

The circulation software system is written in COBOL, and runs on computers using either CP/M or TRS - DOS operating systems. CP/M is a very widely used operating system which can be mounted on many micro computers. TRS-DOS is used on Radio Shack TRS 80 model computers.

To date, four purchases of the circulation system have been made for six libraries. Of these, one is for the control of patrons only; one is being converted to run on the DEC PDP-11; the remainder are full systems for micro computers. Two of the systems have been building patron and inventory files since Spring 1982, and are expected to become operational in the summer of 1983. The purchasers are:

Lawrence Livermore Radiation Labs
Livermore
California

Leavenworth Public Library
Leavenworth
Kansas

Santa Clara County Libraries
San Jose
California
(A three branch system)

Yakima Valley Regional Library
Yakima
Washington

Hardware

A typical station consists of an Intertec microprocessor terminal and an Intertec barcode reader, with the following features:

4 mhz Z80A processor
64K RAM
320K on floppy diskette
barcode reader and keyboard input
video display and audible signal output

The illustration presents a typical multi-station configuration. Such a system is termed "circulation central". Circulation stations housed in the same building are attached to each other directly. Those in remote branches are attached using modems, and leased telephone lines. Local and remote stations can access the circulation files on line at all time the system is up.

It is also possible to install "circulation dial up" stations. These can perform all circulation functions, but do not have to be continuously on line. Instead periodical "batch" connect is done by dial up. Such an option would be useful for small branches or bookmobiles.

All information about the library collection and patrons is held on the disk storage unit.

A printer can be attached to any circulation station. A number of these stations can be connected to a ten KB hard disk drive. The disk unit has its own Z80A microprocessor, operating independently from the circulation stations. This unit can be configured for files of 10 to 90,000,000 characters.

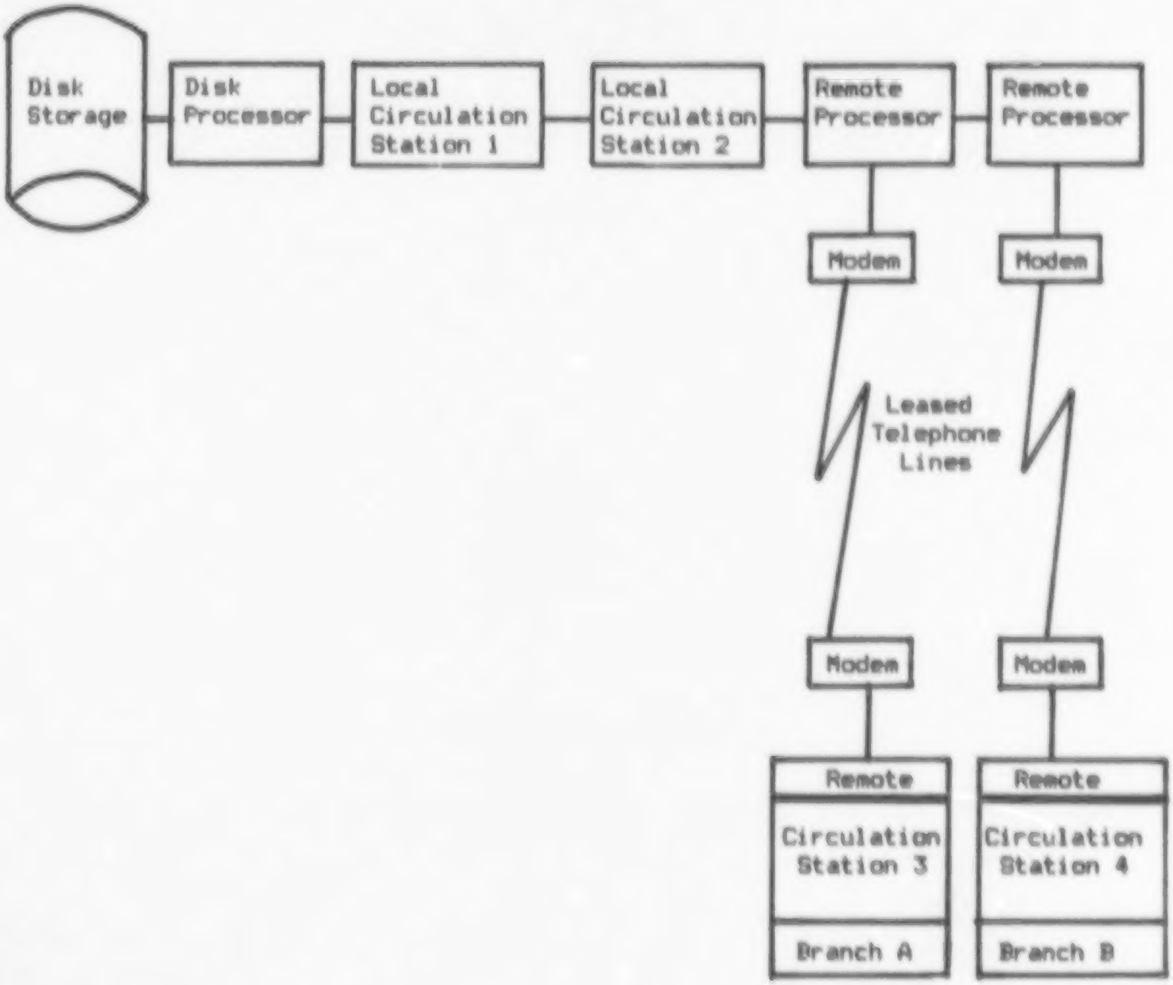
Checkout and Renewal.

Transactions are effected by optically scanning item and patron bar codes using an Intermec 9300 bar code reader. Input can also be made through the terminal keyboard. A timing out factor (selected by the library) ensures that a previous patron's card cannot be accidently charged with the transaction. The date due is automatically assigned, and may vary according to a table of loan period categories. A table of days not to be used in calculating date due is available. Loan periods may be varied at the time of checkout. Date due slips may be printed for each checkout transaction. A stop will be placed on the transaction if an item is on hold, if there is no record of the patron, or if the patron is delinquent. This stop may be overridden through the use of a password. Items may be internally charged to other library locations. Renewal transactions result in automatic discharge of the item followed by a checkout.

TYPICAL MULTI-STATION CONFIGURATION

FOR THE RINGGOLD NONESUCH

CIRCULATION SYSTEM


Disk Storage
Disk Processor
Local Circulation Station 1
Local Circulation Station 2
Remote Processor
Remote Processor
Modem
Modem
Leased Telephone Lines
Modem
Modem
Remote
Circulation Station 3
Branch A
Remote
Circulation Station 4
Branch B

Discharge.

Items are discharged through scanning of the item barcode. There is an automatic notification of items on hold, and the system will display the name, address and telephone number of the patron next on the hold list for the title. A system option permits the printing of a multi part patron notification mailing form. Fines are automatically calculated at the time of discharge. Fines may be paid and cleared at discharge, or the amount may be maintained by the system.

Holds.

Reserves may be placed on items from any terminal in the system, and will be filled by any copy. Special reserves may be placed on specific copies of the title, to take precedence over the standard reserve function. There is a stop to prevent the placing of duplicate reserves on the same title by the same patron. The system can also indicate when a particular reserve is no longer required. The reserve list for any title, showing date reserve was place, patron name, etc., may be displayed. Any patron's name on the reserve list may have its position modified.

Inquiry Function

The system will display title information by copy including location and loan status and date due. Inquiry to patron file is available by patron identifier.

Other Functions

The system also provides overdue control, which includes fine calculations and the preparation of overdue notices on multi part mailers. Management reports include a variety of general circulation and collection management statistics. The system also includes the ability to perform a selected physical inventory of the collection.

Prices

Circulation software costs U.S.$15,000 for the first library, 50% of that for the second library and 30% for each additional library that obtains the software as a combined purchase. (Libraries may use either separate or combined equipment.)

The integrated acquisitions and circulation package is quoted at U.S.$25,000. No price is quoted for hardware, but suitable micro computer configurations, with hard disk drive are in the $10,000 and up range. We expect that this would be a low figure for the Ringgold system, given the cost of the software.

Installation and Maintenance

The purchasing library may either install Nonesuch itself or contract to have it installed by Ringgold. If Ringgold installation is selected the vendor will conduct a training programme for library staff. Ringgold will arrange continuing support for both hardware and software. This can be done by telephone with Ringgold staff with direct terminal communication with the system. Software problems or equipment failure can be diagnosed and, in some cases, remedied through this remote hook-up. Additional on-site support can be provided if necessary. Hardware maintenance and repair can be provided either by Ringgold or by a local computer store. One of the benefits of automation using micros is the availability of repair facilities in smaller centres.

Data Input

The initial input of records on the micro based system can be accomplished in two ways, apart from manual key in. Both involve utilizing a mainframe computer as an intermediary. Various service agencies may be used for the purpose.

The first method is to load source tapes, such as OCLC or RLIN, onto the mainframe, and then either producing disks which can be loaded and run on the micro or sending the data dirctly on line. The second method involves tieing a printer port of OCLC or RLIN into the micro computer. Ringgold comments that it would be difficult to go from WLN in this process, because it uses a parallel printer port. Ringgold has not yet looked at UTLAS for this purpose.

General Comments

This relatively new system was designed by a librarian with technical background both in libraries and electronics, which gives it a certain face validity. However, it is relatively untried as yet, although a steadily increasing number of customers appear to be interested. At time of writing, an installation was being mounted in a Texas library. The software prices are not low, but for the cost, the system has a good range of functions. Its decentralized structure permits fairly easy growth, and it seems to have the capacity to operate in a branch or shared structure, which is not true of every micro based system.

CTI

CTI used to stand for Computer Translations Incorporated. Now it stands for Computer Technology Inc. Under the former name it was begun in 1979 by Brigham Young University. Its first product was designed to use computers to aid in human translation. In 1981, the university sold CTI to Management Systems Corporation who later sold it to Government Systems Group Inc. CTI's initial entry into library automation was the installation of a large number of "backup" micro computer based circulation control systems, often in support of CLSI, but some in conjunction with other systems also. These installations now number about 100. Before the installation of its intelligent port selector, one was used at Edmonton Public Library. These installations provide a security system in the event of failure of a larger system. The CTI equipment enables the library to continue with automated circulation functions, provided volume is not too high. At the end of the day, the transactions can be offloaded to the primary system. Such a facility would be of use in branches, departments or book mobiles, but would probably falter in a main or very busy secondary outlet.

Since the initial development, the vendor has completed a number of installations of stand alone micro based circulation systems, using Apple II's and III's. A number of larger systems have also been installed, running on Microdata and Prime microcomputers. Government Systems Group, Inc. is a major Prime computer dealer. Management Systems Corporation, as it happens, was a large Salt Lake City Microdata dealer. Three standalone Apple based systems had been sold in late 1982. Six smaller and one large (in Brigham Young University) Microdata based systems have been installed. The number of Prime based systems could not be determined. While the Apple is definitely a micro computer, Microdata and Prime are on the borderline between micros and minis. In these instances, not only circulation is provided. The following functions are supported:

Circulation
Audio visual booking
Accounts payable
Accounts receivable
Payroll
Word processing
On line catalogue

The company states that it is presently developing the following capabilities for CTI:

Acquisitions - order generation
- fund accounting
- encumbrance control
- claiming
(all promised for April 1983)

Serials - order generation
- fund accounting
- encumbrance control
- check in
- claiming

(all promised for June 1983)

There appears to be no immediate plan to provide a cataloguing module.

Hardware Requirements

a. Apple

This is the smallest of the three CPU's available, with 48K RAM, and up to 20 MB on CORVUS hard disk storage. Apple II systems can accept a variety of other models of video terminal, printers and disk drives, for both floppy and rigid disks. This system would be sufficient for a library up to 8,000 patrons, with 40,000 titles and an annual circulation of 100,000.

The Apple III offers up to 256K of primary memory, and sufficient secondary storage to accomodate libraries with 8,000 to 15,000 patrons, 80,000 titles and 300,000 annual circulation. All Apple systems use either Integer or Applesoft BASIC. However, the CTI system uses a combination of BASIC, Assembler and PASCAL, the latter a high level language. In backup installations, up to 2000 transactions can be recorded per disk.

b. Microdata

This system has 1MB prime memory and up to 1 GB of secondary storage. It uses a REALITY DBMS, which is considered good for control of data base files. System language is the relatively slow BASIC, however.

c. Prime

The system uses a Prime 450, with 8MB primary memory. Using up to a maximum of eight hard disk drives, each from 136MB to 255 MB, a maximum of 2040 MB storage can be used. It is also possible to utilize a tape drive, in larger systems. These would be 9 track, 75 ips, 1600 bpi. The Prime system uses ADDS 60, or 90 video terminals. Info/BASIC is used on Prime's own Operating System.

Circulation System

The full range of circulation, reserves, recalls, holds, and ILL functions are available. Loan period options can be defined locally. An Intermec light pen is used to read bar code labels on each of the three system configurations. Files can be accessed by call number, LCCN, ISBN, ISSN, author, title, subject and publication date. Boolean logic searches are supported.

Data Input

Records can be loaded from OCLC, RLIN or WLN tapes, and appropriate batch interfaces are available. Some other local data bases have also been successfully loaded. If this method can not be used, records must be keyed in manually. A MARC compatible record structure is used. The system can in fact receive data from any other source, provided it is on 9 track, 1600 bpi tape, blocked to fixed length fields.

Prices

Apple II software package	U.S.$3,000
Apple III software package	U.S.$4,000

N.B. If hardware is purchased from CTI, the total system will cost from U.S. $6,000 to $17,000.

Microdata/Prime software

Circulation package	U.S.$20,000
Other modules	U.S.$8 -$15,000 each
Total for all modules presently available	U.S.$86,000

N.B. CTI does not encourage purchase of software for the Microdata or Prime, independently, but prefers to market the complete hardware/software package.

Maintenance - Apple software	U.S.$400/annum
- Microdata/Prime software/hardware	approx 10% of purchase price.

General Comments

This was one of the first micro based circulation systems, and aroused a great deal of interest for that reason. That initial promise has perhaps been clouded by the several corporate changes that have since occurred. These corporate changes have been accompanied by hardware changes. For example, since the Government Systems Group, Inc. acquired the CTI system, it is unclear whether the Microdata based facility is still sold. Accordingly the vendor seems to have been much involved in rewriting the software to run on different systems, rather than in expanding its capabilities. Meantime other systems have appeared, some of which are closer to being true integrated systems. However, CTI does possess a number of advantageous features.

The circulation system does possess a fairly wide range of functions. Because the system comes in at least three versions, with differing capabilities, it could be used effectively by several sizes of library, and could provide some room for growth. The micro computer configuration is relatively cheap, though not the cheapest on the market.

The backup application has been extensively used, and remains a worthwhile subject of investigation. However, it is to be noted that such an application is becoming available from other vendors. CLSI, for example, which CTI has been used to backup, is now producing its own micro based system, which presumably would replace CTI's backup utility.

GAYLORD SYSTEM 100

The development of microcomputers costing below $10,000 has for the first time given smaller libraries the opportunity to consider the benefits of automating aspects of their operation, but to take full advantage of that capability all but the tiniest of those libraries have had to face the cost of installing expensive peripherals, such as hard disk drives, to increase the limited storage capability and inconvenience of floppy diskette storage. The Gaylord System 100 software program provides an opportunity for these libraries to automate their circulation procedures at a relatively low cost, with a minimum micro installation. No heavy investment in hard disk capacity is necessary. The connection to a large mainframe installation makes this possible.

Gaylord Brothers Inc. are based in Syracuse, New York. The company has for over 80 years been a major supplier of library equipment and furnishings, with business in both Canada and the United States, from all types of libraries. In 1979 it introduced an automated circulation control system, which was based on a stand alone mini computer housed in the library, linked at night to the Gaylord central mainframe. This system used DEC equipment. Gaylord has since introduced another mini based circulation system, called the Gaylord 1000/2000. The System 100, running on an Apple micro computer is its latest innovation.

The Gaylord software, running on an Apple II Plus micro, permits the automatic updating of books, patron and fine records. It will flag delinquent patrons and alert staff to books that are on hold as they are cleared. Patron overdue notices can be produced with a minimum of effort. The system will generate a variety of library management and patron useage reports.

The system provides the following range of circulation functions:

Checkout

The library clerk uses a light pen to scan barcode labels on the patron card and items to be loaned. During this process the system monitors the delinquent file to ensure that the borrower is in good standing. An audible and visual will alert the clerk if the patron is listed in the delinquent file. The system will automatically calculate the required return date based on the material class and parameters predetermined by the library. The loan period may be modified on the spot, to take into account vacation or other such long term loans. Material may also be issued to another library branch location or to other library areas.

Check-in

Returned materials are removed from the out-file record utilizing the light pen and the bar code label on the item. Fines may be collected and accounted immediately when the patron pays for the overdue books or charged to the patron if overdue books are processed from a book drop. Fines information is stored in a patron's on-line file on disk.

Renewals

The renewal function operates with or without borrower cards or physical items in hand, a useful flexibility for telephone call-in of renewals. The renewal transaction causes an automatic discharge of the item of the item followed by a new charge. The clerk will be notified of any hold placed against the item before the renewal transaction is completed.

Holds

Patrons may request a hold on any circulating item held by the library. A hold placed on a multi-copy title will result in a stop being placed on the first copy to become available.A previously completed hold card (either patron or staff completed) is then mailed to the requester with notification of the successful hold. The library may specify a hold queue size, beyond which a purchase alert report will automatically be created by the system.

Notices

Patron notices on the GS-100 are produced by the Gaylord host computer without the involvement of any local staff member. Thus the labour of this task, and close control of it as well, is removed from the library. The message on each patron notice may be formatted by the library to meet its own specific needs, the notices may be printed in different languages as required. The library has the choice of mailing notices itself or having Gaylord carry out that task as well.

Communications

The transaction file is transferred after library hours to the host computer without any human intervention. The host computer calls the GS-100 and, after a proper "handshake" between the computers, the transaction file for that day is dumped to the host computer. The process is completely automatic and does not require any operator intervention. All subsequent paper handling and data processing is done at the host computer facility.

Management Information

Since a large mainframe host computer is at the base of this system detailed statistics and reports may be generated. These include circulation statistics by material type, call number group, geographic location, time of day, patron type and other criteria. The system will also generate a discard report listing those materials which have not been used for a preset time period and are thus candidates for withdrawal from the collection.

Management reports include daily, monthly and year-to-date system information on circulation actvities, items added and withdrawn, fines collected, copies owned, interlibrary loan activity and others.

Data Conversion

As with any automated system the method utilized for converting catalogue records to a machine readable format is a major consideration. Gaylord offers several options. If your library already has a machine readable data base from OCLC or some bibliographic vendor, Gaylord will undertake to convert your records directly to GS-100 circulation control records. Experience has indicated that this not always as easy a task as it may sound. Strict performance controls are called for in any conversion contract signed.

Should the library not have a machine readable data base available, Gaylord will allow it to match its shelflist against the Gaylord data base, which contains 1.6 million titles, in order to extract the Gaylord record control number. This control number is then keyed into the local micro, along with the call number, number of copies and location. Gaylord will then process the floppy disks producing the data files, inventory holding reports and barcode labels. The economics of this method of conversion assumes a large percentage of hits on the Gaylord database. Once the shelf list data input is completed, item labels are produced in shelflist order. These labels are both machine scanable and visually readable and carry call number, title and author information. Bibliographic data for those items not found in the Gaylord data base must be keyed into a screen format.

System Features

Each GS-100 circulation module, in a single terminal hardware configuration, is designed to support up to 100,000 annual circulations. Multiple terminals can be linked to allow for a higher circulation.

Computer Hardware

An Apple II Plus micro with 48K of memory together with an additional 16K random access memory board is required. A 1200 baud modem (together with a telephone line) serves as the communications link with the Gaylord host computer. A calendar/clock card and a light pen are also added.

Disk Drives

Two 5 1/4 inch disk drives with a 150,000 character capacity each are necessary. The Apple DOS (operating system) is used. These disk drives will allow for the handling of 2000 items in circulation at any given time. Gaylord does note that the addition of a Winchester hard disk drive would increase response speed and allow a transaction file of 20,000 items or more.

Video Monitor

A twelve inch CRT, displaying 24 lines, at 40 characters per line, is expandable to 80 characters per line.

Light Pen

The light pen is supplied has a scanning rate of 2 - 20" per second. It reads codabar format barcode labels and uses Gaylord's scanning software for what is described as "accurate and fast reading."

Language

The system is programmable in Applesoft Basic (included) or in many other languages, with the appropriate language card, including PASCAL, FORTRAN, LOGO, and COBOL.

Optional Features and Software

An anti-glare screen is available for the monitor. A colour monitor is available, as well as a numeric keypad which expands the rather limited Apple keyboard. Further disk drives may be added as well as the laser barcode scanner. An in-house letter quality or dot matrix printer may be driven and a battery powered back-up kit is available. As with any Apple, an 80 column display board and upper/lower case chip may be added to the basic Apple.

In addition, other Gaylord GS-100 software modules, such as acquisitions, catalogue cards and overdue notice writer are available. The hardware can service a single independent library, or act as a branch terminal for the larger GS-1000/2000 mini computer based circulation system. If desired, several GS-1000 circulation control systems can be connected on a network to share the same data disk for a multi terminal system.

Prices

The initial cost for the GS-100, in the United States, is as follows:

GS-100 hardware including

Apple II computer
2 disk drives
1 monitor
light pern
16K expansion board
modem
TOTAL - $4,240

GS-100 software - $2,500

For each title added to the host computer data base, there is a $0.05 integration charge. Labels for the books and cards for patrons are $0.04 each. The master data base microfiche is $100 with a monthly supplement service, if desired, of $30 per month. The monthly charge per terminal is $150 plus $0.04 per circulation, which includes: communications costs, overdues preparation, report generation, and all hardware and software maintenance.

Additional Capabilities

Gaylord has now developed the option of using Winchester hard disk drives, which are available in three models ranging from 6.7 to 20.5 million bytes in capacity each. In addition the Corvus "OMNINET" networking system will allow for attaching up to 64 GS-100 Apple systems together with a capacity of up to 80 million bytes of on line storage.

Current Developments

Gaylord has reported a spurt of new business with the signing of four new contracts for its GS-100 automated circulation system, along with letters of intent from five potential new customers. The most recent libraries to sign on include Moorpark Community College Library (California), West Des Moines Public Library (Iowa), East Cleveland Public Library (Ohio) and Avon Lake Public Library (Ohio).

General Comments

The Gaylord System 100 seems to us to be a bridging development being used by Gaylord, so that it can match up growing interest in library micro computer use with an understandable corporate desire to maximize use of its mainframe computer. Communications costs, whether daytime or nighttime rates are used, continue to be one of the most expensive components of computer use. therefore, in our opinion, smaller libraries interested in automating their circulation function would be well advised to look at the growing range of stand alone micro computer based circulation systems, as well as at Gaylord. An Apple or TRS-80M together with a hard disk drive and appropriate software should give a library adequate capacity to handle circulation in the range of a quarter of a million per year. Use of such a system gives complete local control, and eliminates, if not reduces high communications costs. In most cases, the initial investment would not be much more than required by the Gaylord System 100. Any extra dollars spent would soon be recouped by savings on communications.

CLSI

CL Systems Inc. is the oldest of the turnkey library system vendors, having installed its first system in 1973. In 1981 it had the largest sales in the industry, but over half of the sales were to existing clients, who were upgrading or expanding their systems. Dataphase and GEAC actually had a greater volume of new sales. At this time, CLSI has sold over 200 LIBS 100 installations, serving over 400 libraries. The system basically provides circulation functions, to which have recently been added acquisitions and public access modules.

CLSI's early entry into the field has constrained its growth in two respects. It developed its own hardware-dependent, non-transferable software, to exploit the limited capacity of the early minis. It has had to spend a considerable amount of money and effort on software development to allow movement to larger CPU's, and multiprocessor systems.

Its most recent move has been into the micro computer field. CLSI is the fourth turnkey vendor to take this step. The others are AVATAR, CTI, and DATAPHASE. The new CLSI system, termed System 23, uses the same basic software packages as the mini based LIBS 100. CLSI claims that this facilitates upgrading to the larger system, when the library exceeds the capacity of the micro.

System Description

The machine selected was the DEC LSI 11/23. The basic system has 256K of primary memory that can be expanded up to 1MB, as compared with the 64 to 256K of many micros. Up to 16 terminals can be supported, for the circulation control application, public access catalogue, book acquisition module, and the materials booking module. Various specialized modules are also available. these include reserve book room, networking and MARC input tape.

A 96MB cartridge model disk drive is used as secondary storage. This drive can load up to 80,000 brief bibliographic records, averaging 350 characters each. A DEC compatible RH-11 disk controller is used, along with a DEC LA-38 printer. 80,000 character pedestal mounted disk drives, or high density 300,000 character cabinet enclosed disk drives are optional possibilities. Connected to this basic configuration can be other standard CLSI terminals, printers and magnetic tape units. All the components used in the System 23, apart from the CPU itself, are used in all other LIBS 100 systems. At time of upgrade, therefore, a minimum of additional equipment need be purchased. The circulation process can be carried out using either light pen or laser scanner.

Functions

The system provides applications very similar to those available from LIBS 100, limited primarily by the lower volume which can be tolerated, and the size of the individual record. In addition to check in and check out the following functions are available:

Identify delinquent borrowers
Identify borrowers with expired cards
Identify non-circulating materials
Identify improperly checked-in materials
Permit renewals and telephone renewals
Produce receipts and notes, simultaneously with transaction
Identify book on reserve
Place and cancel reserve
Permit patron and item file modification
Relay messages via terminal
Permit data base enquiry
Determine due date, and permit change
Calculate fines, and print overdue, fine and bill notices
Permit payment of fines in part or in full
Record and compile statistics for daily use, on terminal or in hard copy format
Permit patron and item information to be purged automatically
Permit recall and print patron recall notices

Maintenance

CLSI has carried out all its own hardware maintenance, because until recently, much of the equipment was modified before shipment to customers. This has made it difficult to contract for third party maintenance by the original vendor or by independent hardware maintenance organizations. For customers in major metropolitan areas, close to such maintenance facilities, this has been somewhat of a drawback. CLSI has a significant number of service representatives, but cannot hope to match those employed by DEC, which supplies much of the hardware. This problem carries over to the supply of spares. However, this should not create any problems for libraries in Alberta, because CLSI has subcontracted servicing to DataTech in Edmonton. In addition, possibly, a shared pool of equipment, such as terminals, etc. could be maintained. Typically, it has been found that CLSI maintenance agreement prices have been somewhat higher than those quoted by other vendors. This is due in part, at least, to the fact that the agreement covers software as well as hardware. Incidentally this avoids arguments about whether the hardware or the software is responsible, when some problem arises, calling for maintenance of some part of the system.

Prices

A basic central site installation costs U.S.$40,000. The cost of the software package begins at U.S.$7,500 per function, with the circulation software priced at U.S10,000. Software is not available separately. A basic circulation system might therefore cost a minimum of U.S.$60 - 75,000, once all factors had been included. Tape transports, for loading files, and backup on larger disk drives up to 300 MB are available. Such a fully configured system, with all software packages included, could cost U.S.$125,000 or more, almost as much as some mini based systems.

General Comments

The CLSI micro is at the top end of the micro scale. Its compatibility with the larger CLSI system is obviously a strong advantage, and one which must be considered by a growing library. On the other hand, for small libraries, it may well be that the price is not atttractive, when compared to those of other micro based systems. The Richmond Micro Software system, for example, could be purchased for less than $10,000, including between $500 and $1,000 for the software, and providing a number of functions in addition to circulation. In addition, the low number of terminals supported (16) reduces the possibility of libraries sharing in the implementation of such a system, particularly if some form of public access catalogue is desired.

The first library to order the System 23 was Appleton, Wisconsin Public Library, which plans to use it for circulation and a public catalog. Installation was planned for June, 1982, initially on a 11/34 computer. The first stage was to include seven terminals, including a CLSI touch terminal for public access to the on line catalog. Appleton intends to develop the bibliographic data base using Innovative Interface's unit to provide an on line link to the library's OCLC terminal. It was expected that completion of the installation would take some six months.

One of the strong advantages of System 23, is the proven nature of the basic CLSI software, and the company's track record. In addition, the vendor's method of software upgrading (by regular new releases), ensures that the purchaser will be able to share in the benefits of a constantly developing system. This might not be the case with some of the smaller and newer vendors of systems.

The brief record, could limit the utility of this system, if it were to be used in conjunction with other automated systems, such as cataloguing, which used a fuller record. However, for circulation alone, especially in smaller libraries, the record should not prove disadvantageous.

OTHER SYSTEMS

The systems described in some detail in the preceeding sections consitute only a selection from a wide array of possibilities. Some other systems which libraries might wish to consider include the following:

Apple Orchard

The Orchard System's Circulation Management System runs on the Apple II, with a minimum of one disk drive, 48K RAM, DOS 3.3, using the Applesoft version of BASIC. In addition a 132 column printer is needed. The system can operate either in batch or direct mode. It can handle a maximum of 600 circulated items at any one time. However, this limitation can be overcome by categorizing the circulation - for example, into fiction and non-fiction, or by class number ranges - and using a separate disk for each. In this way, a circulation of many thousands could be managed. The system appears originally to have been designed with the needs of school libraries in mind.

The system costs U.S. $125. It provides **customer registration and support**, with updates and enhancements at discounted prices; **automatic fine assessment and incrementation; automatic overdue slips and lists generation**; circulation **analysis**; and **single menu operation**. A built in back up program allows easy duplication of information.

Checkmate

Developed by the California Library Authority for Systems and Services (CLASS), this system provides a serials control package. It runs on a Radio Shack TRS 80 Model II, and supports up to 2,000 records on an 8" floppy disk. Functions include:

Check in
Claims
Routing
Binding
Accounting
Production of title and subject lists
Subscription expiry alert reports

Based on user determined claim intervals, the Checkmate Programme automatically scans the file for expected issues. The routing system can accomodate up to 250 names, each patron having up to 64 title, and each title having up to 64 names. The accounting system can total and display expenditures for all subscriptions charged to each of the accounts. The system software costs about U.S.$1,800

Golden Retriever

This is another system developed by the California Library Authority for Systems and Services (CLASS). The software, mounted on a TRS 80 Model II, permits keyword searching, using Boolean operators, sorting and printing on a data base of up to 4,500 records. It allows small libraries to produce catalogues and bibliographies, indexes and check lists. The software sells for U.S.$1,800.

For both Checkmate and Golden Retriever, CLASS has announced an agreement with Gaylord, which will market and distribute CLASS microsystems, except in some areas of the eastern United States. As an authorised distributor of CLASS microsystems, Gaylord will demonstrate and install both software packages. All software maintenance will be handled by CLASS.

Integrated Library System (Lister Hill)

The Computer Technology Branch of the U.S. National Library of Medicine's Lister Hill National Centre for Biomedical Communication has designed this system. It will operate on DEC PDP/11, Data General Corp.'s Eclipse, and IBM Series/1. The only micro computer on which it is operational at present is the PDP-11/23. The Library of Congress Loans Division has just installed ILS. The system features:

Master bibliogaphic file

This file supports all of the subsystems, including circulation, on line public catalogue, acquistions, cataloguing, and serials control. The file will accept data from utilities such as OCLC and RLIN.

Bibliographic control subsystem

The system supports four major activities bibliographic file and index definition, MARC tape loading, cataloguing and editing, and authority control. An interface for OCLC is currently being developed.

Public access catalogue

This subsystem permits searches by author, title, subject, call number, ISBN, ISSN, LCCN and OCLC number. Future developments include a touch terminal and the addition of Boolean operators.

Circulation

The subsystem supports all of the usual circulation functions, through the use of barcode labels. In addition there are two interesting features. The system permits the control of items temporarily located on such things as specific book carts, or technical processing shelves. Secondly the shelf function maintains statistics on the use of items within the library.

Serials

The serials check in feature is the only portion of this subsystem yet available. Claiming, bindery tracking and summary holdings maintenance are planned future developments.

Acquisitions

This subsystem remains to be developed.

The system operates on the Meditech Interpretive Information System (MIIS), which uses a version of the MUMPS language. MUMPS is an integrated operating system, data base management and programming language.

Vendors of ILS

The ILS software is owned by the U.S. government, and made available to the public through the National Technical Information Service (NTIS) at a cost of approximately U.S. $2,000. However, NTIS does not provide hardware, an operating system, installation, training, modification or any ongoing support. Such services are available from at least two companies.

Online Computer Systems Inc., of Germantown, Maryland, claims to have more ILS sites and more ILS experience than any other company. It supports the installation at the Army Library, in the Pentagon. Recent sales gave been made to the University of Maryland Health Sciences Library, and to the U.S. Naval Research Laboratory Library.

Avatar Systems Incorporated, of Poolsville, Maryland supplies a turnkey version of ILS providing hardware selection and installation, software preparation and documentation, staff training and ongoing hardware and software maintenance. This company was formed by former associates and designers of the ILS project at the National Library of Medicine. Avatar has mounted the system on a timesharing basis in the Washington D.C. area.

Prices

The minimum cost for a complete stand alone system, implemented in a small library, would be about U.S. $50,000.

PET Computer Library Card Maker

This system requires a Commodore PET micor computer, with a minimum of 16K RAM. It uses BASIC 4.0, a C2N datasette or 4040 disk drive, and an I.D.S. 440 printer, also known as Paper Tiger. The system is aimed at small libraries of all kinds, and will print up to seven catalogue cards from a single keyboard input. It is also expected that a label printing capability will be added.

Printing can be done immediately or stored for later generation. Data is displayed on screen, and includes format, fairly full record, ISBN and three subject headings.

The price of the system is $100 for tape, and $110 for disk.

System To Automate Records (STAR)

Cuadra Associates, of Santa Monica, California, has developed STAR, which is a micro computer based information storage and retrieval system, described as "user friendly". It is designed especially for organizations desiring a sophisticated retrieval system, to access in house data bases. It operates with a 128K CPU. The data base is flexible, and includes variable record sizes and field lengths. A large data base capacity can be stored with a 96MB hard disk drive.

The retrieval function allows the user to use a wide range of search capabilities, including Boolean operators, control execution of search logic through the use of parentheses, and to combine search requests one with the other, to utilize numeric ranging, and to sort records by any field. the system includes the Alpha Micro, two or three terminals, 90MB of memory and a printer. The hardware costs between U.S.$40 and $45,000. the software, written in Assembly language costs U.S.$19,500.

Summary

This study has reviewed a range of micro based computer systems for libraries. Some of these systems are single function. Others are multi function. The degree of integration of the latter is also varied. In each instance, developments are in process either to upgrade the system application, to extend the range of applications, to make applications run on alternative computer systems or configurations, to connect with other systems, or some combination of all of these.

This circumstance reflects a more general volatility in the micro world at large. It is found in respect of both hardware and software developments. The advances in each of these create problems in adjustment for the other. There are two major forces at work. The first is a continuing, even accelerating reduction in the cost of certain critical computer components, accompanied by an equally dramatic increase in their powerfulness. The second, in the software domain, is an explosion of programming capabilities, recently given additional impetus by the development of Applications Generators, or fourth generation languages. This occurence could not happen until the memory capacity and CPU speed and effectiveness increased to the point that the time of human input became a more critical limiting factor than the technical characteristics of the machine. That point has now virtually been reached, and system developers can now afford to be less scrupulous in the conservation of these factors. The result is that programmes become easier to write. More of them get written for more applications, and changing them becomes easier.

For libraries, micro developments bring both advantages and disadvantages. The major advantage is obviously related to price. The average minicomputer installation may well contain $200,000 worth of hardware and $150,000 worth of software. Site costs may easily add a further $50,000 to the capital investment and annual operating costs will run to 10% of the capital investment. These are major expenses well beyond the capacity of small libraries to bear. They may be mitigated somewhat through participation in a shared installation, but are still high. And it is wise to remember that shared installations often bring with them problems of governance and decision making beyond the capacity of small libraries to cope with in terms of the heavy staff involvement required. Micros permit smaller libraries to consider the possibility of automating of specific functions at a far more bearable cost. The basic capital investment for a hard disk micro system can be as low as $15,000. Site requirements are modest and maintenance is reasonable and possible in smaller centres, where that might not always be the case with a minicomputer installation. In addition the more modest cost of the system will permit many libraries to become involved in automation without the necessity of sharing, thus avoiding the governance and decision-making problems inherent in shared arrangements

Another consideration for the smaller library is that the purchase of a micro computer may permit its application to a wide range of other, non-library specific functions, in particular word processing and accounting applications. While it is true that mini computers are more than capacious enough to run such programs, the software is often prohibitively expensive, and in any event such applications have not always been written for dedicated library mini computer systems. In the world of the micros there are thousands of programs that will run on the CP/M operating system, for example, which in turn can be mounted on many varieties of micro computer.

The micro can also be used as a terminal for connection with other systems, especially for bibliographic searching, and for electronic mail. For example, OCLC has established a project, reported in the OCLC Newsletter, February, 1983, to investigate micro computer options for access to OCLC. The micro provides a relatively inexpensive entry into the automation world, permitting the library staff (and users) to become familiar with a technology which will undoubtedly become more important in many other fields as time passes.

A countervailing problem results from the rapid introduction of micros into the library field. The dozen or so systems referred to in this study are representative of what may well be hundreds across the continent. Inevitably there will at some point be a shakeout process, and many systems will cease to be supported. At that time libraries will either have to maintain the system themselves, or purchase another. Meanwhile the influx of new systems continues.

There is still relatively limited storage space on many micros, even using hard disks. This may encourage user libraries to use brief records, and while useful in the immediate context, this is likely to bring problems in the longer term, as libraries - and other organizations - become increasingly interconnected.

The number of terminals that can be supported remains somewhat of a problem, though less so for the small single outlet library, which in any event is not likely to require more than eight to ten terminals. Even the CLSI micro system, where an installation might cost $125,000, appears able to support only 16 terminals. This could particularly be a problem should libraries wish to use their system for an on line public catalogue. Another drawback is found in the relatively restricted communications abilities still characteristic of micros. This can be overcome, but often may require development of interfaces not yet existent.

Taking all of these factors together, we believe that the smaller public libraries of Alberta can obtain from these systems at least some applications which could probably find a place in the developments of the next five years. It would permit smaller libraries to automate various functions independently, though it must be remembered that this may increase the difficulties of establishing the desired "network of networks".

Appendix

List of Systems Reviewed

Avatar Systems
Suite 205
11325, Seven Locks Rd.
Potomac
Maryland 20854

(301) 983-8900

California Library Authority for Systems and Services (CLASS)
Suite 101
1415, Koll Circle
San Jose
California 95112

(408) 289-1756

CL Systems Inc.
81, Norwood Ave.
Newtonville
Mass 02160

(617) 965-6310

Computer Technology Inc. (CTI)
1455, State St.
Orem
Utah 84057

(801) 224-1390

Cuadra Associates Inc.(STAR)
Suite 305
2001, Wilshire Blvd.
Santa Monica
California 90403

(213) 829-9972

Gaylord Systems Division
P.O Box 4901
Syracuse
New York 13221

(315) 457-5070

Library Systems and Services Inc. (MINIMARC)
General Motors Bdg
Suite 100
1395, Piccard Drive
Rockville
Maryland 20850

(301) 258-0200

National Library of Medicine, Computer Technology Branch (ILS)
Office of Data Services
National Technical Information Service
Springfield
Virginia 22161

(703) 487-4807

Online Computer Systems Inc.
20010, Century Blvd. # 101
Germantown, MD
U.S.A. 20767

(301) 428-3700

Orchard Systems
207, E. Third St.
Waunakee, WI
U.S.A. 53597

(608) 849-5727

PET Computer Library Card Maker
John Horemans
2588, Inlake Ct.
Mississauga, ONT
L5N 2A7

Richmond Micro Software
Box 94088
Richmond
British Columbia V6Y 2A2

(604) 596-8853

Ringgold Management Systems (NONESUCH)
Box 368
Beaverton
Oregon 97075
(503) 645-3502

MINI COMPUTER BASED SYSTEMS
FOR LIBRARY AUTOMATION

A study for

the

Alberta Public Library Directors' Council

by

Dr. David R. Williams

and

Derek R. Francis

LMG The Library Management Group Inc.

New Westminster, B.C.

March 1983

EXECUTIVE OVERVIEW

This study of mini based library automation systems reviews five shared installations, using five different vendor systems. The co-operatives reviewed, with the system in use, are:

Spokane Cooperative Library Information System (SCOLIS)	ULISYS
Fraser Valley Regional Library System	EASYDATA
Marigold Library System	MINISIS
North Suburban Library System	CLSI LIBS 100
Houston Area Library System	DATAPHASE

The basic functional applications for automation in libraries are also reviewed, and some attention is devoted to the question of costs of various aspects of automation in a shared implementation. A tabular presentation of certain features of the above five systems, together with GEAC and RINGGOLD NONESUCH is also included.

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INTRODUCTION

The terminology generally in use for computers, distinguishes between "mainframes", "mini computers" and "micro computers". The principal differences between minis and mainmfame computers are largely a matter of physical size, cost and the availability of software. In recent years, the line between the two, as between minis and micros also has been closing, and there are now numerous machines of which it might be difficult to say whether it was a large mini or a small mainframe, or a small mini and not a large micro. However, the term does still retain some utility, and in particular, mini computers still continue to be used in typical limited application, stand alone configurations, in medium to large sized organizations. Many library systems fit into this pattern.

The typical mini computer features a 12 to 16 bit word size, an operating speed measured in micro seconds, and primary memory capacities of 64K to 1MB. It has the ability to support a variety of peripheral devices, including multiple on line terminals. Just to confuse things further, there is a category of machines which is coming to be known as "superminis". These are characterised by 32 bit words, operating speeds measured in micros or even nanoseonds, and with primary memory capcities which may exceed several megabytes. They can support the same types of peripheral devices as mainframes.

Not until the late 1970's did mini computers become sufficiently capacious to offer a real shared alternative to the single library stand alone mainframe systems popular throughout the decade. This opportunity permitted a new, cheaper stand alone possibility, and also a new form of shared development, either using a mini computer in a role analagous to that of the mainframe, or in a distributed network configuration, where no one library can be viewed as the all encompassing central unit. The mini computer manufacturers themselves have not been slow to recognize the importance of such sharing, and the requirement for dependable communication links.

The communications linkage requirements of minis are significantly different from those of the mainframes. They are typically concerned with communications over relatively short distances, commonly less than a hundred miles, in contrast with the hundreds or even thousands of miles for mainframe to mainframe communications. Additionally mini computer users require a limited number of linkages, rather than a complex multi-node telecommunications network.

Finally, of particular significance to telecommunications, the terminals on mini based systems are usually asynchronous "quote" terminals, whereas a mainframe tends to be linked with synchronous terminals, having some built in communications protocols.

Much work in the past five years has gone into the development of these communication links. WANGNET is one such. IBM has been working on similar lines, as have both the U.S. and Canadian telephone systems, XEROX, with its ETHERNET, and many others. Most mini computer systems use dumb terminals, which are less expensive, but adequate to the task, when they are located within a few hundred feet of the computer site. Unfortunately, when there is a need to link these terminals remotely, options are limited, because there is as yet no standard communications protocol to adopt.

By 1978 several shared mini based systems were extant. One of the best known is the North Suburban Library System in Illinois, which uses CLSI. A feature of recent shared developments is the emergence of multi-type library consortia, in contrast to the primarily public library groups of the 70's, and the academic consortia, generally based on mainframe computers. there are several reasons for this. The first is that the systems themselves are becoming more sophisticated. Offering more than just circulation, they are more attractive to academic and special libraries. Secondly, the record structure has become more flexible. Thirdly, reducing costs, especially in the mini computer range, has made the initial investment less onerous and risky. Fourthly, general resource sharing, and networking in particular have become more popular and more acceptable as governance problems have gradually faded.

In effect it is now possible for groups of libraries to establish shared systems using minicomputers, under certain circumstances. The primary constraint is one of distance. In a mini computer environment, thirty miles is about the limit for distance between participants. After this, communications costs begin to compare with the cost of additional hardware - one of the attractions of minis, after all, is their relatively low cost when compared with mainframes (but not with micros). Library Technology Reports, in April 1982, admittedly in a U.S. context, made the following analysis.

> "The rates for dedicated lines within a state are usually from $4 to $10 per month. If an installation were to have ten terminals, the cost of connecting to a central unit (CPU) thirty miles away would be $2100 per month, based on an average charge of $7 per mile per month. Over a five year period that would be $126,000, an amount that would almost pay for the duplication of the central-site hardware and software at the remote location. While it is possible to reduce ongoing telecommunications costs by having terminals share a line, that in turn increases the capital and maintenance costs for multiplexors and other telecommunications hardware."

BCUC in British Columbia encountered similar cost considerations which led to the establishment of BCLN. In this case, use of a mainframe some two thousand five hundred miles away led to communications charges of several thousand dollars per month.

Within this geographical limit, then, it is worth looking at potential shared systems. Direct economic benefits may be real, though probably only of the order of some ten per cent of overall system cost over a five year period. Of course indirect economic and service benefits may be generated. Some of these are reviewed in the following sections.

CIRCULATION

Circulation control is the function, other than cataloguing, that is the most commonly automated on a local computer system, paticularly in public libraries. Circulation transactions in a manual environment normally cost substantially less than $1.00; in the surveyed Alberta public libraries they average $0.36 per transaction. The creation of a machine-readable data base costs at least $1.00 per title. The system software and hardware normally costs in excess of $175,000. The consequence is that few mainframe or mini computer automated circulation systems have been shown to save money. It is only in public libraries with annual circulation transactions ten or more times the number of titles in their collections that the automated systems have been cost efficient. The major cost benefit is that most automated circulation systems have brought under control rising costs in those libraries which experience rapidly rising circulation. However, to the extent that any cost benefit may be available for small or medium libraries, using mini computer based systems, it is more likely to be captured in a shared rather than in an autonomous environment, provided that communications costs can be strictly controlled.

Nevertheless, libraries do automate circulation, and do derive real benefits. Speed of the work is increased, and greater volume can be attained, sometimes with relatively little increase in staff costs. Accuracy and reliability of records is improved, leading to better patron relations, and more reliable data for material recovery. In some systems, such considerations alone may be worth thousands of dollars per year.

Automation of circulation is a two edged sword. Rarely is it the case that just enough equipment could be bought to handle existing workload. Almost always the system, more expensive though it be, is capable of doing far more than the current manual one. Naturally the library uses these extra features for various desirable ends - better collection management, for example, through detailed knowledge of use patterns. Consequently the total cost may go up, though the cost per transaction may actually have declined.

Furthermore it is invalid to compare costs of a single function before and after automation, since current library software allows for easier implementation of multi function systems. Thus the more expensive circulation system may also be permitting a less expensive acquisitions system, or better public inquiry.

Library Technology Reports, in the March-April 1982 issue comments that

> "The libraries that have reported the greatest benefits from the automation of functions other than cataloguing have been those that have shared an automated system for circulation control. In most cases the motivation for sharing was economic, but the most dramatic effects were increased interlibrary lending and reciprocal borrowing, enabling library patrons to obtain more of the materials they required."

However, we know of no published reports as yet which display hard data that would demonstrate this claim to be an established fact. For now it is a conclusion which appears intuitively probable, on mostly anecdotal evidence.

Libraries considering the introduction of a mini-computer based library circulatioon system should keep in mind the following principles:

1. Automated circulation alone is rarely cost beneficial in a straight comparison with manual systems. Not until annual circulation volume begins to run around ten times the overall number of titles does this break down.

2. Few manual systems can cope well with an annual circulation, from a single outlet, of more than 250,000. In terms of transactions, this is equivalent to some 600,000, since each item must be checked out and then back in, and there are overdue notices and requests to handle also. Some consider a circulation system begins to be overloaded as low as the 100,000 mark.

3. The real cost of implementing a circulation system can be reduced by some 10%, if shared with one or more other libraries. It follows from this that regional or multi branch libraries are in an advantageous situation. However, the thirty mile communications limit on cost-efficiency must be remembered.

4. The automated circulation function should not be evaluated only on the basis of a strict comparison with the existing manual one, since it brings with it the ability to carry out new and desirable tasks, which help to warrant any additional cost.

5. The automated circulation function should not be considered in isolation from other library functions, since automation of these can usually be combined in a single package.

CATALOGUING

When considering introduction of mini computer based automation it is important to remember that none of these systems is a cataloguing system in the sense that UTLAS or OCLC is a cataloguing system. They all have to have records put into them from somewhere else, because the whole MARC tape files cannot be loaded onto them for system use. Although this study does not deal with systems such as MINIMARC, it is worth noting here, that MINIMARC does present one method of accessing the entire MARC and CANMARC data bases, in house, with the capability to load into other in house automated systems, thereby lessening the severity of this comment. MINIMARC, however, comes at a price.

What the mini does offer is potential public access to an in-house on-line catalogue. Another possibility, of lessening interest is their ability to store and collocate the holdings record, for production of a hard copy catalogue. In either event, the records have until very recently, all had to be keyed in, with a concomitantly high and expensive labour component.The mini based systems mainly started out as circulation systems - Easydata is one outstanding exception to this - and then began to add other functions as their utility for the purpose became more apparent. However, because the circulation function had only required a brief record, the systems' suitability "as-was" for storing the cataloguing record was not great.

Three things have happened to make the mini computer systems useful for a broader range of functions than circulation, and in particular for cataloguing. First, many of the turnkey manufacturers have succeeded in expanding the size of record stored in the system, thereby making it of utility for a wider variety of tasks, and of greater interest to the fastidious breed of cataloguers. Secondly, many of them have been made MARC compatible, allowing for easier integration with other systems, for a variety of purposes, including as sources of cataloguing copy. Thirdly, interfaces and software programs have been developed which permit loading of data directly in machine readable format, thereby eliminating or reducing the expensive labour involved in manual key entry.

In reviewing mini computer systems from the standpoint of cataloguing, the following points should be kept in mind:

1. The record length should be adequate for cataloguing purposes, and for whatever purposes the library envisages for the future.

2. Record structure should be MARC compatible.

3. Machine loading of both retrospective and current cataloguing data must be feasible.

4. A working, validated software interface with a cataloguing utility (such as ULISYS and CLSI have with UTLAS and OCLC, for example) is desirable.

5. What other functions are available, and are they integrated?

6. Can the system be interfaced with others, both internally and externally?

7. In particular, could it be used for public access?

ACQUISITIONS

This function is not usually one under great pressure in libraries of the size considered in this series of studies. Nonetheless, since many of the vendors have completed acquisitions modules, the function is obviously worth reviewing, especially since there are at least three main subsystems available - monographs, serials and audio-visual materials. The development of automated acquisitions is proceeding more slowly than was forecast by vendors and the library world in general, even as late as 1980. At one time it was thought by vendors that the serials acquisitions function was the most suited of all library functions to automation techniques. This was before they became aware of how truly complex serials management procedures were. Serials is now the least automated of library procedures. The slow-down in acquisitions automation as a whole is primarily due to the realization by vendors of how complex is the overall task, and also because it is in the area of fiscal control that libraries are least able to accept a degree of conformity in their specific requirements. Auditors and municipal or other governing authorities may all impose requirements which must be followed.

Acquisitions includes at least the following functions, and in some cases many more:

Order generation (including returns)
Fund accounting
Commitment control
Order follow-up and review
Claiming (serials)
Check in (serials)
Cancellations
Standing orders
Verification, payment and cheque generation

The acquisitions department may well be the most complex of any in the library. At any one time it must be keeping track of from hundreds to hundreds of thousands of individual items and orders for items, in a wide variety of physical formats, from many different publishers and a whole host of intermediaries. Sometimes, especially in Canada, more than one country may be involved, possibly with foreign languages.

Within the department, many different statuses for orders may result in the generation of different files - on order, in process, received but not paid, received and paid, claimed but not answered, claimed and answered, urgent, duplicate copies, searched, verified, etc. It is not surprising, therefore, to find that many libraries do not keep very comprehensive statistics of the activities of their acquisitions departments, yet such information is as vital in the development of an automated acquisitions system as it is in selecting among competing systems.

There are two basic ways to use minis for automation of the acquisitions function. The first is to purchase a mini which offers the function as standard or as an option. The other is to use the mini as a terminal to a jobber's or bibliographic utility's automated acquisitions system.

The advantages of an integrated acqusitions package offered by a commercial vendor such as CLSI or GEAC are that it will have a relatively low price, can be quickly delivered and its capabilities are known. As with all turnkey systems, extensive modification to the software is not possible, therefore the library must accept the features offered. Local idiosyncracies can rarely be easily accomodated.

Review of an acquisitions package should cover the following:

1. Are all the tasks listed above accomodated?

2. How flexible is the searching system, especially the number of access points?

3. Can the system interface with other functions. In particular, can the cataloguing department and the public access it?

4. If the library is using a bibliographic utility for cataloguing, can the system interface with the utility? (This avoids multiple keying of records)?

5. Does the particular system offer other applications modules, and if so are they all integrated?

ON LINE INQUIRY

Card catalogues - there is no getting away from it - are cumbersome, labour intensive, and expensive to maintain, particularly at more than one location. In their flight from the card catalogue, libraries have turned to computer produced book, fiche and film catalogues. Unfortunately, the cost advantage briefly enjoyed by these formats, is fast vanishing. Accordingly, libraries are considering the direct use of the machine record.

This most recently developed of the common library automated functions is the one which owes the most to the development of large storage capcity mini computers. Library catalogue files have the characteristic that they must store vast amounts of information with a relatively low level of access to those individual records. Recent developments have greatly increased the storage capacity of minis at the same time as costs have dropped for that capability. In addition if you have your data base stored within or close to your library the heavy communications costs that would otherwise be sustained for catalogue access are eliminated or greatly reduced.

As against this, the cost of terminals remains relatively high, so that to provide access for many patrons at once can be costly. Studies of patterns of patron usage are desirable for any library considering implementation of on-line public access. Some studies already done indicate that 30% - 40% more on line terminals would be required than fiche or film catalogue stations in any installation. This is presumably because terminals are seen by patrons as "user friendly" and result in vastly increased usage.

A study by King Research in 1980, showed that an on-line catalogue is more expensive than a card catalogue over a five year period. The major reason for this was the initial cost of record conversion. (The study used $0.72 per record, which we consider conservative.) However, where a library has several outlets, and wishes to maintain a full union catalogue of the system at each, it is likely that the cost advantage would go the other way. Again, regional and multi-branch libraries stand in an advantageous position, and some form of shared implementation by autonomous libraries seems promising.

As recently as Spring 1982, Library Technology Reports could note that no library had yet put both its catalogue and its circulation control on line. Less than a year later, the West Vancouver Memorial Library, using ULISYS, mounted on a municipal computer, had done this. Over twenty installations of CLSI's public access catalogue module are now operational. These include the Iowa City Public Library, the Duluth Public Library, Salt Lake County Library and the Atlanta County Library.

In considering the utility of a mini for this function, review the following:

1. Can the mini support the number of terminals that will be required?

2. Can all elements of the total system be accessed in this mode?

3. Expanded search capabilities, such as Boolean operators are desirable.

4. Response times are particularly acute for public access.

5. Screen layout and menu presentation are particularly important for public understanding and acceptance. The system must be seen as "user friendly". One of the criticisms aimed at Telidon, for example, is that the hierarchical nature of its structure makes access particularly tedious.

INTER LIBRARY LOAN

For many years libraries have relied on a system of blind borrowing or the use of costly and cumbersome union card catalogues, to facilitate inter library loan. These techniques have been supported by a wide variety of communication methods, ranging from Canada Post to electronic mail, which have been used both to transmit requests, and to deliver materials. The inter library loan mechanism in North America was initially a very informal one, with most libraries participating. This informal mechanism was generally based on national union catalogues, to which only the largest libraries contributed. Consequently they failed to represent the true resources available, distorted borrowing patterns, with resulting time delays in obtaining material from far away which might be held locally, and placed an undue burden on the larger libraries. For these reasons, as time has gone by, area inter library loan networks have come into being, some libraries have opted out, or restricted their participation, or begun to charge for their services.

Area networks, such as PNBC, BCUC, and the various Alberta systems, are now beginning to be aware of the same kinds of pressures which led to their development in the first place. Again the question of costs is becoming salient, as is that of the right of any particular library to have access to the system. Many of the area networks, though not in Alberta, were based on somewhat more complete holdings records. This reduced blind borrowing, spread the load more evenly, and reduced costs. In addition, many of the area networks made use of specialized communications and delivery systems, such as the Alberta Government Courier, and B.C.'s FIN system, to solve the long turnaround problems characteristic of ILL arrangements.

Despite these efforts, the system continues to be a costly one, with individual transactions often costing almost as much as the material borrowed. The result is that in most libraries, ILL has become a hidden service, an adjunct of reference rather than circulation, and one that is rarely advertised. Levels are not high among most of the surveyed libraries in Alberta, the average representing only 0.22% of regular library circulation transactions (22,100 to 9,829,183). This compares, for instance, with a North Suburban Library System percentage of 0.34 (50,000 to 14,300,000). A byproduct of a shared or linked on line cataloguing or circulation system is the ability to locate required items and transmit ILL data.

For years, OCLC users have searched that data base as part of their ILL borrowing strategy. Some BCUC users have begun to use the UTLAS data base in the same way. Shared CLSI and other circulation systems offer the same opportunity for copy location.

OCLC and WLN have responded to this need by making Inter Library Loan modules available to their users. These modules facilitate location of holding information and routing of the borrowing request.

The introduction of this capability has had two effects. Inter library loans have become relatively more convenient and less costly. Secondly, the disappearance of blind borrowing has had a radical effect on inter library lending patterns. The burden of lending has been lifted from the larger libraries and shifted more evenly throughout the group of cooperating libraries. The new technology may well cause another set of problems to develop, as smaller libraries, formerly net borrowers, realise that the number of items now being requested from them might well exceed their capability to provide the service. The computerized network provides the tool with which to change the nature of inter library loan, but as with all new technologies, raises as many questions as it answers.

INTERFACING

Given a mini computer, libraries have a powerful tool for automation of most functions. Nevertheless, the adequacy of the mini for on line storage of the whole MARC data base is not yet an accomplished fact, and makes their ability to communicate, at least at a low level, with other systems, imperative, to obtain basic cataloguing data. One might question whether it is particularly desirable for most libraries to store the whole MARC data base in house, even when minis make it possible. Our response to this is that the desirability of this capability is entirely a question of cost. As with any other commodity, if the price comes down far enough, the number of buyers will increase. As long as it is high, consumers will turn to other alternatives. Oil and gold are but two examples of this phenomenon.

The necessity to obtain cataloguing data is basic to library operations. However, there are other requirements for interfacing, and these make it desirable that more flexible interfacing should be available. These might include access to a jobber's on-line ordering system, access to the automated systems of other libraries, or generalized reference searching of a number of data bases, both bibliographic and full text, as Telidon terminals, or for electronic messaging and transfer.

"Foreign" Interfacing

The development of stand alone mini computer library systems has led libraries to look at the feasibility of networking on a basis of linked equals - so-called distributed networking, in contrast to mainframe based networks. Technically feasible though this is, there are as yet no widely accepted protocols for interfacing among library systems. Such protocols would cover record format, file structures, command languages, record access methods, indexing methods, and system performance priorities. Indeed, to date there has been little reason for vendors to concern themselves with such matters, and some incentives for not doing so.

Two basic types of interfacing outside of the library in house system exist. The first is a terminal to computer connection which permits a terminal to access another system and perform the same activities as an in house terminal of the "foreign" system. The second, lower level, variety, is a terminal to computer capability, in which a terminal from one system can log onto another system to search the data base or leave messages only. With this linkage the operator cannot alter records or instruct the "foreign" system.

Identical System Interfacing

The problem is somewhat reduced when the "foreign" system, is identical to the in house system. here the only task is the basic one of comunications, and no programme or format conversion is required. However, a problem can exist, if the system is flexibly designed to permit optional local modification, especially if this allows the alteration of the basic record structure or file arrangement. Such can be the case with CLSI, for example.

Internal Interfacing

A library may have two reasons to investigate this capability. In the first place, a system purchased for a library of a given size may eventually be outgrown, or the library may choose to add other functions to the system. At that point it would be desirable to have the option of simply adding to the existing plant, rather than having to buy a completely new system. However, to do this, the existing CPU needs to be capable of being linked to one or several more of the same kind (or indeed of other kinds), and while this can always be done in theory, it is convenient if the system has been specifically designed to make it easy. CLSI has done this. GEAC and Data Phase have attempted such linking. Other vendors attempt to make their software transportable to more capacious hardware.

In considering this function, the following points need attention.

1. What form of networking is contemplated, and what functions are to be included? Furthermore, what other local library systems are in use, and how easy would it be to interface the selected system with them?

2. Local modifications require careful advance consideration and preparation, to permit easy later linking.

3. Is the record structure MARC compatible?

4. Does the system selected have external telecommunications and special networking software available.

5. Is the system expandable by simple addition and linking of new CPU's?

MINICOMPUTER BASED SYSTEMS

The following systems are used in the shared library systems reviewed in this study.

CL Systems	North Suburban Library System
Easydata	Fraser Valley Regional Library System
MINISIS	Marigold Regional Library System
ULISYS	Spokane County Library System
DATAPHASE	Houston Area Library System

In addition, some information is presented on Ringgold NONESUCH and GEAC.

SAMPLE SHARED SYSTEMS

Introduction

As part of the study, five shared systems were reviewed. Topics covered included:

System Description - history, functional components, structure, Governance
Operating Costs
Capital Costs
Data Conversion; Method and Costs

The systems reviewed included one co-operating group of autonomous multi type libraries using ULISYS, (SCOLIS), one well-established regional library system using EASYDATA, (Fraser Valley), one newly established regional system using MINISIS, (Marigold), one co-operating group of autonomous public libraries using CLSI (North Suburban Library System) and one group of autonomous public libraries using DATAPHASE, (Houston Area Library System).

SCOLIS

System Description

Five major autonomous libraries, possessing sixteen fixed and three mobile outlets among them, comprise the Spokane Co-operative Library Information System. They include public, university and community college libraries. The inclusion of private libraries has been specifically prohibited, to date.

SCOLIS began in 1978, when the Spokane County Library District decided to automate its own seven library circulation system. In 1979, the project expanded to the present membership, and SCOLIS was formed officially. Computer equipment was delivered in 1980, and began service in 1981. All facilities were on line by April, 1982.

The system provides circulation and on line inquiry. It operates on a DEC PDP 11/70 CPU with 512 K memory, TWE-16-AA tape drive, 3 RP06 disk drives with 528M memory, 45 VT100 and VT102 terminals, 4 LA34 DECwriter IV printers, 3 LA120 DECwriter III printing terminals; 37 Intermec 9300 and 9400 barcode scanners; Racal-Vadic and Kinex modems; MICOM multiplexors.

The system software is ULISYS, and the Operating System is DEC RSTS/E v7.1. The programming language is BASIC Plus.

For 1983, the system expects to serve 150,000 patrons, with a bookstock of 500,000 titles, and 1,000,000 items. Projected circulation for 1983 is 2,800,000. The system is up for 90 hours each week.

Management of the system is administered by the Director of the Spokane County Library District, for the District's Board of Trustees, with system management under the District's Technical Services Co-ordinator. Services are provided by the District through a Memorandum of Agreement with Eastern Washington University, Spokane Public Library and Washington Community College District 17. A Co-operative Users Council, consisting of the Directors of participating libraries, serves as an advisory group to the District. There are also a number of operational lower level committees.

The system is working well, although a number of minor problems have been encountered. It is reported that the project had considerable difficulty getting different kinds of libraries to agree on common management goals. In the current system, bibliographic searches appear to be hampering response time. Another problem occurs with public inquiry. Patrons who are not familiar with the system experience difficulty with lag time in responses. Their tendency is to recommence the search, causing system problems.

The SCOLIS Library Card can be used in any of the sixteen facilities, and the patron can request and borrow any item regardless of ownership. Books can be returned and any service charges for overdue materials paid at any facility. Four of the participants share the same library card, and all five have the same overdue deadlines, service charges and overdue notice production schedule, making for a degree of integrated co-operation at an unusually high level. SCOLIS now advertises that its users "have access to over a million books and other materials, and they can request and borrow them more easily". In effect, from a patron standpoint, SCOLIS is a single library system.

Operating Costs

The direct operating costs of the system in 1982 were in the neighbourhood of U.S. $100,000. This included equipment maintenance, software maintenance, central salaries for 2.5 FTE staff, and the printing and mailing of centrally produced notices. A SCOLIS fund is maintained jointly by Spokane County Library District, Spokane Public Library, the University and the Community College District, each of whom pays 25%.

Participants pay individually for their data lines. Costs are not available for this function. In addition, because the members own remote equipment (Spokane County owning the system equipment), maintenance and other costs for these are an individual responsibility.

No figures were available for indirect system costs. These would include any additional staff costs due to increased business, costs of producing and loading catalogue records, bar coding and similar processing tasks required for an automated environment. Nor were figures available for any savings attributable to use of the automated shared system. These could include better use of acquisitions funds, due to better knowledge of neighbouring library holdings, reduced assistance in circulation, etc.

Capital Costs

Hardware used in the SCOLIS system is as follows:

PDP-11/70 and RSTS/E including

512K bytes of ECC/MOS memory
2K bytes of parity bipolar cache memory
Bootstrap loader
Serial line interface
Real time clockk
Integral memory management
LA120 console terminal
RWP06 disk controller, plus 176MB drive
H9600 double width cabinet
H9602 cabinet (single width) with BA11-K expansion box and DD11-C expansion back plane

The costs of this installation in 1980 were U.S.$123,100 In addition, the following central site hardware was acquired at the costs indicated, all in U.S. dollars.

3 DH11-AD Multiplexors, at $7,600 each	$22,800
2 RP06 Disk drives, at $34,000 each	$68,000
TWE-16AA Tape drive	$18,850
3 LA 120 Printers	$7,800
3 Dial in ports, at $750 each	$2,250
3% Installation and warranty	$7,217
Overall Total	$250,017

Some of the individual library costs were as follows:

Spokane Public Library

15 VT100 terminals, at $1,900 each	$28,500
12 Intermec wands, at $900 each	$10,800
6 portable wands, at $1,200 each	$7,200
3% Installation and warranty	$855
Total	$47,355

Spokane County Library

17 VT100 terminals, at $1,900 each	$32,300
13 Intermec wands, at $900 each	$11,700
4 portable wands, at $1,200 each	$4,800
3% Installation and warranty	$969
Total	$49,769

Spokane Community College

3 VT100 terminals, at $1,900 each	$5,700
3 Intermec wands, at $900 each	$2,700
3% Installation and warranty	$171
Total	$8,571

Spokane Falls Community College

3 VT100 terminals, at $1,900 each	$5,700
3 Intermec wands, at $900 each	$2,700
3% Installation and warranty	$171
Total	$8,571

Eastern Washington University Library

5 VT100 terminals, at $1,900 each	$9,500
4 Intermec wands, at $900 each	$3,600
1 Portable wand	$1,200
3% Installation and warranty	$285
Total	$14,585

In addition this installation required $34,000 for bar coded labels.

The capital costs of the total system were U.S. $433,000 in mid-1980, including hardware and software. Spokane County, the centre of the system, assumed responsibility for the hardware costs necessary to support its own portion of the system. The remainder of the hardware costs in the central unit were evenly divided among the remaining participants. Each library was responsible for the cost of inlibrary hardware. The exact breakdown is given in the appendix. Exact breakdowns of the respective hard and sofware components of the price are hard to come by, but estimates for the software alone range from U.S. $20,000 to the current quotation of U.S. $90,000. ULISYS was not the first choice of Spokane County, which had initially selected Dataphase. Spokane and this vendor failed to negotiate a final agreement, for reasons which Spokane was not willing to reveal. It may have been that ULISYS made pricing adjustments in order to obtain this contract, though it should be noted that U.S. law appears to prohibit discounting which is not universally available. SCOLIS expects the system to pay for itself in three to five years.

Data Conversion

Method. Some members already had data bases from OCLC and WLN. These were loaded on tape, to form the core of the data base. The other libraries then searched this core data base on line, attached their holdings symbols to hits, and keyed in no-hits.

Costs. No costs are available for this function. SCOLIS itself was not particularly concerned with this task, which was the responsibility of each individual member. Each of the participating libraries encountered different costs, depending on whether their holdings were in machine readable form, the size of their data base, and the percentage of hits.

General Comments

SCOLIS is one of the few multi-type systems sharing a single automated installation. The ability of the Ulisys software to accomodate differing classification systems has made this sharing technically feasible. This feature is not always available in other systems. For instance, Easy Data accomodates the call number at the item level rather than the copy level making the attachment of differing call numbers from different libraries problematical. In addition, we must note that SCOLIS seems to have achieved a very uninflammatory cost sharing arrangement, in which annual operating costs are shared on an equal basis, despite the differences in throughput between the public and academic libraries. This is in contrast to the North Suburban System, where a variety of proportional arrangements are in existence, most recently based on the number of ports used by a given library.

The SCOLIS Memorandum of Agreement for the Provision of Automated Services is included as an appendix.

FRASER VALLEY REGIONAL LIBRARY SYSTEM

System Description

This library was selected for comparative study, for several reasons. It is a regional system in a Western province, and has a mature automation system covering a number of library and general functions. The computer system has gone through one major upgrade, and the library is presently in process of preparing to implement a computerised circulation system in its thirteen major branches, plus the system headquarters. The maximum distance between branches is about 100 miles, but the larger branches are all grouped within 25 - 30 miles of the headquarters building, a fact which has some implications for the economics of an automated circulation and reference system.

Automation was first introduced in the mid 70's, and the initial module was a cataloguing system, to enable the library to place a union catalogue at all service points throughout the system. At that time, all cataloguing was done manually, and a sizeable backlog existed. Only one catalogue was maintained and it was located in the system HQ. The system selected was EasyData, Version One.

The hardware installation consists of a Datapoint 6600 128K, with 12 terminals, and 120MB of storage, using an 800BPI tape drive, and a matrix printer. At the time of upgrade in 1981, Version One was supplemented with Version Two. At present the system is not equipped with any communications facility, although the library is testing out the possibility of using LIBRIS II, since much of their acquisitions is done through Baker and Taylor. In addition, the introduction of the circulation system would require a communications link between the thirteen branches and HQ.

The system is used for acquisitions, cataloguing, inventory control, payroll generation and general ledger, and the tape outputs is used for production of a COM catalogue via NCR Canada. The hardware is owned by the library, and the software is held under a software license.

Although EasyData does offer a circulation module at $20,000 for software, (with, of course, substantial additional costs for hardware), Fraser Valley has decided to issue an RFP to a number of vendors. It has been discussed as a possibility that, should EasyData not be the successful bidder, the library might convert all of its automated systems over to the new circulation system hardware, to gain the benefit of a completely integrated system. Considerations involved in this decision include total hardware and software price for the circulation system, brevity or depth of record (the EasyData Version One record is relatively brief, although Version Two can be more detailed), and ease of conversion of the existing records to the new circulation architecture. The library also intends to utilize the communications link which will be established for the circulation system, to inititate an on line reference inquiry system at its five major reference branches. This function will be available to staff only, and not to the general public.

Operating Costs

The annual operating costs for the existing system are could not be obtained, but are substantial. They do include $3000 per month for hardware maintenance agreements with Datapoint, and an annual Easydata software renewal fee at 10% of the software cost. The Datapoint software maintenance itself runs at $85.00 monthly. Easydata will also supply a facilities management agreement at $300 per month, or $65.00 per hour. EasyData claims that for a system with 50 - 60,000 titles, a system similar to that in the Fraser Valley (which has some 155,000 titles), no additional staff would be required, beyond the hands on operators from the functional areas, plus a system manager, normally the head of technical services. Operating costs for the circulation system, when introduced, are expected to be on the order of $120 - 150,000 annually, excluding staff.

Capital Costs

Capital costs for the original system, of ten years ago, are no longer relevant. Cost for a similar installation today would be approximately $200,000 for the central CPU, plus $30,000 for software, excluding general ledger and payroll generation. There would be some $35,000 additional costs for printers, terminals, etc.

Since no circulation system has yet been selected, no definite price can be established. However, the library has estimated total implementation costs of some $750,000.

Data Conversion

The original data conversion was carried out by in house staff, who typed entries from the shelf list into a terminal. No costs for this process are now available, but it is suggested that four staff were employed on the project for two full years, in addition to professional and administrative staff time. We are of the opinion that the final costs were in excess of original expectations.

For a library undertaking such a project with EasyData today, there is available for $5000 each, a batch or online MARC conversion programme. A library which had machine readable records, could simplify and reduce the expense for the process. Such records are now available from a variety of sources. EasyData software also permits a direct on line link with MARCIVE, a commercial source of U.S. MARC records.

Should a circulation system be purchased from a vendor other than EasyData, the question of converting the existing records to be useful for the new system arises. The library has indicated that the EasyData records are sufficiently simple they may well be useable and capable of loading in their present form, or that minimum changes may be made to the record with simple programming, before such loading. We feel that this may be an unduly optimistic view, and that some additional costs are likely to be encountered for conversion.

General Comments

Fraser Valley is a typical regional library automated system. Like many others it opted to automate the catalogue production function first, in order to make a catalogue available at its many sites. It is comparable to Marigold in the problems with which it is confronted. Now, the library wishes to automate the circulation function, and althoughEasyData has desigend a circulation module, there is some concern that it maught not be the most appropriate choice for the task. This presents an interesting omen for Marigold, which has also elected for the time being, to go with MINISIS, a system which provides cataloguing, but not circulation.

The library uses the EasyData system for a number of non library specific applications, and in this is unlike many libraries, which have not yet implemented these options.

Fraser Valley has also given some thought to purchasing machine readable catalogue records from a commercial vendor - perhaps the National Library or Baker and Taylor. The library estimates that the present cost per title of creating a record exceeds the c$5.00 price from UTLAS, due to their manual key in process. Commercial records are available for some $0.10 per record, although additional staff costs are then entailed in placing an order and then inputting and modifying the record.

MARIGOLD LIBRARY SYSTEM

System Description

Marigold Library System serves rural communities in south-central Alberta. Planning for the system began in 1977, and began operations in 1981. There are 27 member libraries in 30 municipalities, with a total population of about 50,000. The degree of autonomy of the member libraries is relatively high.

In 1982, after only one year's use of manual systems, Marigold became the first public library in North America to purchase MINISIS software, for an acquisitions and cataloguing system. Automation of circulation was considered at Marigold, but rejected because of the cost of on line communications between the system's dispersed outlets. Circulation levels ranged from a high of 39,000 to a low of 63 annually. However the Library had a primary requirement to provide a union catalogue of the resources of the system. A cost study was undertaken to examine the alternate methods which might be used to construct the union catalogue. Certain assumptions were made including an acquisitions rate of 10,000 titles yearly, an amortization period of ten years and an average yearly increase in the Consumer Price Index of 11%. The cost study was restricted solely to those activities needed to generate a union catalogue of holdings. It was determined that "cost savings through automation are substantially in evidence in both the acquisitions and cataloguing sections...The primary area of savings in these operations is in the clerical area of filing, defiling and alphabetizing." The cost study concluded by stating "There is absolutely no question that a computer is essential for the cost-effective provision of services such as the union catalogue for Marigold's member libraries and communities."

MINISIS is a generalized information management package, which has been developed for many kinds of inventory control systems, using an HP3000, the only hardware on which it will run. The system was developed by the International Development Research Centre, an agency of the Canadian Government. The system is sold by Systemhouse Ltd. There are 13 installations in Canada, four in Europe, two in Asia, four in Africa, and three in the Far East. Some of these involve bibliographic data base applications. The MINISIS system is based upon the UNISIST record structure, which is a sort of simplified MARC record, thereby reducing the problems involved in loading machine readable records in MARC format. Systemhouse Ltd., the MINISIS vendor, has successfully loaded CANMARC tapes onto the MINISIS database at Marigold, and the University of Singapore loads MARC tapes onto a MINISIS installation. Marigold does keep copies of records on tape, in MARC format.

The general system provides for five automated authorities, including institution name, a tri-lingual thesaurus, vendor, non-vendor, and a system-wide "stop word "list, which eliminates non filing words and phrases.

Marigold chose MINISIS over their second choice (Easydata) largely because they felt the system was more flexible and capable of change to meet local requirements. As noted above, however, this may lead later to some difficulties in using predesigned interfaces with other systems.

The hardware configuration includes the following:

1	32445A HP 3000, series 40, 512 KB, Series 40 Cable
1	30018A asynchronous data communications controller
1	30019A asynchronous data communications controller extender
1	7935H 404 MB disk drive
1	7970E 1600 bpi tape drive
1	30079A general interface channel for connection of magnetic tape
1	2382A system console
1	OPT 426 JP-18 interface and cable
3	2622A display terminals
4	1322N hardwired cables
1	26313 180 cps printer
1	2609CA sound cover
1	26097A stand and paper catcher

Operating Costs

Marigold has not yet been in operation on MINISIS for a full year, but has included $32,800 in its 1983 draft budget to cover direct operating costs of the system. This includes hardware and software maintenance, HP user group fees, supplies and union catalogue products, (in microfiche) but not the costs of staff.

Capital Costs

The cost to Marigold for hardware was $160,000, and the software license was $12,500. Start up, design and development, an option purchased by Marigold, but not necessarily a part of a MINISIS installation, added another $35,000. HP training was $2,700. Prices for the HP3000 range upward from $40,000, depending on the model. Marigold's Series 40 cost $60,000. The price of a sub-license to the MINISIS system software to Canadian non-profit organizations includes a discount from the regular retail price. Alternatively the system may be leased for 3% per month of the purchase price. There is some indication that Systemhouse, the Canadian vendor, is sufficiently interested in sales to provide attractive pricing options for hardware purchase. In addition to the purchase of the sub-license to use MINISIS, there is a non optional software support service fee, of $5000 per annum. This provides access to system upgrades, the complete information service, remedial maintenance, a telephone consultation service and membership in the SHAL-MINISIS User Group.

Data Conversion

Method. Because MINISIS uses a MARC compatible record structure, it is possible for Marigold to use the National Library's MARC distribution Service. This permits the library to supply the National Library with ISBN's or other access indicators, and to receive back tape loaded machine readable records. this system will be used for both current and retrospective cataloguing. It is expected to take from three to five years to complete RECON.

Costs. In the 1983 budget, $1,200 has been included for National Library tapes. These will be used for both current input, and for RECON.

General Comments

Marigold is the most recent of the Alberta shared library systems, though it is actually federated rather than regional. It has made unusually rapid progress in automating its catalogue production function. A union catalogue on microfiche will be produced from the MINISIS system. Marigold was the first public library in Canada to purchase the MINISIS software. The library opted against an on-line catalogue approach, because of the communications costs involved for its extended system. At present it is not actively investigating automation of other major functions, beyond the cataloguing and acquisitions presently performed on MINISIS. Marigold considers that on line circulation is still some five to ten years away. It places a higher priority on an automated on line access system, and feels this will be in place in five years time.

Marigold investigated a number of alternative systems, before selecting MINISIS over EasyData. The two reasons quoted for this decision relate to the greater flexibility of the data base management system, and because the MINISIS system was more clearly aligned with Marigold's own plans. The MINISIS proposal, for example, included a tape drive, which was not part of the Easy Data package. This is necessary for catalogue production.

Support costs were somewhat of a lesser factor, and MINISIS' greater willingness to provide support in the implementation phase was felt to be advantageous.

Marigold resembles the regional libraries in Alberta, which have also identified automated cataloguing and acquisitions as first priorities. Its choice of MINISIS is a first for a public library in Canada. Development of this system will be of significance and interest to other Alberta libraries.

NORTH SUBURBAN LIBRARY SYSTEM

System Description

This is a consortium of two hundred and fifty libraries in Illinois, including the system headquarters. Sixty six of these are public libraries. The remainder are academic, school and special libraries, which hold affiliated status. This status permits reciprocal borrowing and inter libary loan access. Two groups of the public libraries are involved in automated circulation. The first group which now numbers 23, operates the Co-operative Computerized Circulation System (CCCS). A second group of five libraries operate independent standalone CLSI systems, which have dial up access to each other and to the CCCS.

The system was established in 1966, and began operations in 1967. It serves a population of over 1,500,000, covering an area of 850 square miles. The system is governed by a Board of Directors, with board representatives from each of the member libraries. There is also an Advisory Council, which consists of the administrative librarians. The Co-operative Computerized Circulation System has a separate Board, which has one representative from each member library. That representative may be either a trustee or the chief librarian. In practice, all representatives at present are chief librarians. The System Board of Directors plays little part in the CCCS, except to ratify major decisions, such as a new contract.

The system began its investigation of automation in 1973. After an extensive series of system workshops and consultant studies (two of whom were commissioned to work completely independently of each other on the same topic!), the System decided to implement a shared CLSI installation. At that time, five member libraries were unwilling to place full credence in the ability of CLSI to support so large a shared venture. Accordingly they declined to participate in the shared installation, but contracted with CLSI for independent stand alone systems, to be linked via dial up facilities.

The initial CCCS installation began in 1974, with a single cluster serving six libraries. As further libraries indicated a desire to join the cluster, it became apparent that the CLSI system indeed would encounter some problems in supporting a single installation of that size and complexity. Therefore, a second CLSI cluster was established in 1977. This second cluster began with three to four members. New members have joined, bringing the clusters together to their present membership of twenty three. As these new members joined they were assigned to one or the other cluster, to ensure a continuing balance in the workload. The two computers actually operated side by side, but with no connection, not even a dial up access, because of the anticipation of an eventual merging. Finally, in 1982, CLSI was able to achieve this long promised merging, by the use of their linked multiprocessor technology. The new system consists of four multiprocessors - PDP 11/34's, supporting 85 terminals. At the same time, the five stand alone systems continue to operate as separate, but linked (via dial up) facilities.

The primary function of the system is for circulation. Inter library Loan is carried using the circulation module. One of the major reasons for the 1982 upgrade was to permit the member libraries to utilize the CLSI Public Access Catalogue module. The first library will be putting this function up in March 1983. All of the North Suburban CLSI installations use a state wide protocol to gain dial up access to six other CLSI installations in Illinois. In addition, the State Library, using federal funds, is developing a translator/processor which will ultimately provide transparent linkages between all of the systems in the state. It is reported that this is at the point of completion.

Operating Costs

Operating costs for the system are based on an eighteen month period, to accomodate the widely varying financial years of the member libraries. For the period January 1982 to June 1983, these costs are estimated as follows:

	U.S.$
Hardware maintenance	99,980
Central Salaries	73,842
Other operating expenses	9,172
Insurance	1,500
Communications	59,651
Total	244,145

Operating costs have been shared on a number of bases over the years. Both circulation and communications lines have been used as a basis of allocation. The system is now moving towards sharing costs on a per port basis.

Capital Costs

The initial single CLSI installation cost U.S$300,000. The second about the same. North Suburban operates under an agreement with CLSI called "The Support System Contract". Under this arrangement, CLSI is paid a fixed sum each time an additional library joins the system. In return, CLSI is responsible for maintaining the system hardware at a level which will permit effective functioning. Accordingly, a library may sometimes be added to the system, and CLSI will receive a payment, without the necessity to add central site hardware components.

There are four classes of fixed sum, based on annual circulation. Under 100,000, the fee is U.S.$3,000 - $6,500 per circulation station, depending on terminal type selected, with a minimum of two stations. In addition two extra support system fees must be paid at U.S.$13,000 each. This money is used by CLSI to provide additional facilities, when necessary, at the System HQ. For libraries of from 100,000 - 250,000 the terminal costs are the same, but the required support system fees are $13,500 each. For libraries of from 250,000 - 400,000 the support system figure is $20,000.

This contract is to be replaced, now that the previous two separate unlinked installations have been replaced with a merged facility. The new contract calls fc- terminal payments as follows:

	U.S.$
Model 100 keyboard	1,500
Model 150 laser checkout	6,500
Model 500 "	3,500
Model 450 "	6,000
Model 450 with printer	6,580
Model 700 touch terminal	5,000

In addition, the support system charge is U.S.$6,500 per on line terminal. North Suburban cost studies estimate that half the capital cost of a typical standalone installation is saved under this arrangement, although some of these savings are negated by line communrications charges. The system director has noted that operation of the shared system involves a substantial human input, from each library, which is often uncosted. Much of this results from meetings.

Data Conversion

Method. Initially, all data input was keyed in manually, by the seven member libraries. Members now have the option of searching the data base, and adding holdings symbols, and keying in no hits. OCLC tapes can also be loaded.

Costs. The system did not keep records of the costs of data conversion.

General Commments

A number of difficulties have been encountered in this implementation, especially because true computer to computer interfacing was only recently introduced into the system, after a number of years of difficulties in its implementation. Even now, after installation of the merged facility, an operator wishing to access any of the five stand alone CLSI CPU's from a terminal must separately dial up to each one and log on. Consequently as many as six separate searches may have to be conducted to find a given title.

Early system specifications required the vendor to provide a computer to computer interface, but only in 1982 was this accomplished. Furthermore, each of the five stand alone systems has certain local modifications which require operators to learn many special search techniques and command structures. One of the five independents is considering joining the larger shared system. Another is reportedly considering shifting to Dataphase. It might be said North Suburban is both a shared network and a non-shared network, inasmuch as the stand alones and the merged central facility operate together under a larger umbrella. The problems are exacerbated by the fact that 38 libraries in the system are still operating in a manual mode.

It is interesting to note the comparatively lower degree of emphasis which was placed by this system on the costs of creation of the initial data base. Two reasons may account for this. In the first place, the lower wage rates prevailing in the area, than in the Canadian West, may have resulted both in a lower actual cost for data conversion, insofar as it was done manually, and also have caused the difference between labour intensive operations and capital intensive machine operations to be less pronounced. Secondly, this system was implemented at a time when Federal funds for many projects were generously available in the United States. Possibly, the topic would be of greater concern, were the system beginning its operations in 1983.

The North Suburban System places a heavy emphasis on resource sharing and regards the on-line circulation system as the primary tool for effecting such sharing. Over 50,000 ILL transactions were reported in the past year. The system is supported by a daily delivery service to each of the member libraries.

HOUSTON AREA LIBRARY SYSTEM

System Description

This system is comprised of the Houston Public Library and 18 other agencies in seven different public library systems, separated by as much as 90 miles. HALS itself is more than just an automated circulation co-operative, and in its full scope is comprised of fifty two public libraries, for which HPL serves as the major resource. In 1977, as the Houston Public Library's circulation level exceeded 5,000,000 per year, studies indicated that the batch circulation system would require continuing additional manpower, that would be difficult and expensive to obtain. At the same time several of the medium sized libraries in the Houston area were themselves investigating implementation of automated circulation systems.

An ad hoc committee was appointed to investigate the possibility of a co-operative system. This committee produced a study which made the following major points.

An on line regional circulation system would

1. Increase the value of the book collections by 10%, through faster turnover of the books. This increase was valued at over $1,000,000.

2. Provide a union catalogue facility for over 300,000 titles, mmaking HALS into a true network.

3. Reduce certain existing costs in HALS' libraries by $1,700 per week.

4. Improve the each library's ability to collect fines.

5. Provide management information that would permit more effective expenditure of funds.

The committee recommended that the co-operative project be undertaken between Houston Public Library and HALS. Initial implementation cost was estimated at $350,000, and this was close to the actual cost. This was to be equally divided between HPL and HALS. It was recommended that seven library systems join the network in the second year. It was also recommended that HALS purchase the first two terminals for each library, and fund data line costs for the first year, with the libraries to assume responsibility in succeeding years. Eight libraries received terminals when the system was implemented. One of those decided not to continue with participation in the system and returned its terminals.

An automation committee was established, with representation from all participating libraries. This committee drew up a set of guidelines for the direction of the shared system. It was agreed that membership would be open at first to public libraries only, with other types coming in only when the basic needs of the HALS libraries were met.

HALS appointed a director for the Computer Access Network. Policy decisions were to be the province of the Automation Committee, with the HALS Advisory Council holding the right of final approval. A written annual contract was drawn up to govern the relationship between the system's membership and the Houston Public Library. On becoming a network member, a library agreed to fund a share of ongoing central site operating costs, if network funds were insufficient. The Automation Committee prepared a five year plan for system growth, showing the order in which interested HALS libraries would receive terminals.

Draft specifications were drawn up for the proposed system, and an RFP was issued. A detailed analysis was made of each bid using a seven year time period for cost comparisons. CLSI had the lowest initial hardware costs, but its high maintenance charges made it the most expensive system overall. DataPhase was the least expensive system overall. In addition there was some concern over the size of the bid CLSI CPU, along with its inability for expansion at that time (prior to CLSI'S introduction of multiprocessor configurations).

The cost of doubling disk capacity was estimated as follows:

CLSI	$56,000
DataPhase	$26,000
Systems Control	$17,000

The DataPhase system was recommended as the vendor, and implementation began in early 1978. A Data General Eclipse S/130 with two disk drives was installed in that year. The first task undertaken was loading the Houston Public Library's readable file of 320,000 records. At the same time the other five initial libraries began adding items to the data base. Houston also input all newly purchased titles from this point on.

In less than a year it became apparent that the Eclipse S/130 did not provide sufficient CPU capacity. In 1979 the S/130 was traded in and an S/250 was purchased for an additional U.S. $25,000. Upgrading of the central hardware continued in the following year with the addition of two new disk drives. Throughout this period the system is said to have encountered response time problems. Only one of the member libraries was actually running an on line circulation system, handling 400,000 transactions yearly, in 1979/80. Accordingly a decison was taken to upgrade the software and hardware again. HALS decided to move up to ALIS IIe software, configured around a Data General TANDEM computer. This upgrade in in process now, at an estimated total cost of U.S. $1,100,000. when the system is fully operational, it is anticipated that it will support up to 150 terminals, with an annual transaction load of 12,000,000.

The problems encountered during this experience have apparently been faced in some cases by other libraries using DataPhase. Library Technology Reports, in the March-April, 1982 issue review of automated circulation control systems, commented

> DataPhase normally offers secondary storage on 50 and 192 MB disk drives manufactured by Data General. A few libraries have demanded and received Control Data 300 MB disk drives, that have greater capacity and are less expensive then the Data General drives. DataPhase has resisted supplying Control Data disk drives, because Data General would not then maintain all of the system hardware. Instead, a local third party service firm would have to be engaged to handle hardware maintenance. As many as 20 DataPhase customers have run out of disk storage space well before they expected to. This is partially because the libraries have loaded longer records than quoted in their specification but also because DataPhase has insisted on the 192 MB drives even when the library requested the 300 MB drives. DataPhase has apparently underestimated the overhead required for its system, especially the amount of disk storage necessary for authority control.

Operating Costs

The annual operating costs for the present partially operational system are as follows:

	U.S.$
Hardware and software maintenance	50,000
6 central staff	96,000
Total	146,000

Communications, local maintenance and other costs were not available, since they are the responsibility of the user library, not of HALS, but are in addition to the above. For the new system, hardware and software maintenance fees will total

U.S. $80,500 annually.

These central costs are divided between Houston Public Library and HALS as follows:

HALS pays for two positions. HPL pays for the remaining four. The maintenance fees are split 50/50. HALS itself is completely funded by the State Library and grants from the Federal Government. There is concern about the future of the Federal funding.

Capital Costs

The initial basic central hardware configuration was estimated to cost U.S.$350,000 and consisted of:

Data General Eclipse S/130
2 Data General Disk Drives (192 MB each)
Terminals and related accessory equipment

The present central hardware consists of:

Data General Eclipse S/250 (896 KB)
4 Data General Disk Drives (192 MB each)
9 Track Tape Drive
OCR Printer (30 CPS)
Data General LP2 Printer (120 CPS)
Multiplexor (64 ports)
48 Racal Vadic Modems (1200 baud)
3 Auto answer Modems

To move to the present configuration from that initially purchased entailed additional costs in the neighbourhood of U.S. $50,000.

The upgrade now taking place will result in the replacement of the S/250 CPU with a Data General three processor configuration TANDEM. The primary memory capacity of this machine is 32MB, in contrast to the 256K of the early S/130. The full cost of this development is U.S. $1,178,000, broken down as follows:

	U.S. $
Equipment	804,000
Maintenance (two year contract)	161,000
Software	96,000
Interest	117,000
Total	1,178,000

Data Conversion

The initial title file was the large MARC format bibliographic data base of the Houston Public Library. This 320,000 record file contained 50,000 brief records as well as more complete MARC records, and was prepared for the system by Brodart at a reported cost, in 1979, of $0.10 per title.

HALS did not opt for the barcode label approach, but instead selected DATAPHASE'S UCR option. Several of the other HALS libraries approached the conversion process differently from Houston Public. An example is Pasadena, which inventoried its total collection, placing an OCR item label on each book and on the appropriate shelf list record. The second phase of the process was to search the bibliographic records and add the item number to the title record on the on line system. The average hit rate for the whole conversion procedure was no higher than 55%. By the end of August, 1981, seven library systems had built an on line data base of 403,000 titles (1,209,000 items), and almost 300,000 patron records. This had taken three years to accomplish.

Houston Public Library now adds 25,000 new titles to the system yearly, using an OCLC tape interface, which permits OCLC archival tapes to be loaded.

General Comments

This system is noteworthy as a large co-operative composed entirely of public libraries, of widely differing size and funding. The system in use in HALS, Dataphase, is that which was originally selected by SCOLIS as the preferred vendor. SCOLIS commented that it was the "state of the art" system. No definitive reason for the failure of SCOLIS and Dataphase to conclude a contract has been publicly stated.

HALS is an example of a shared system funded to a large degree by other levels of gevernment, and consequently acutely vulnerable to the winds of political change. The system is now attempting to find some acceptable way in which to off load some of the charges directly to the member libraries. The degree to which this is accomplished, and with what manner of in system political consequences may be of considerable interest to Alberta libraries presently contemplating shared development of automated systems.

Jay Clark, Director of the HALS Computer Access Network, notes that

> since Federal support for such projects can be expected to decrease, an important matter to assure the future of such networks is developing a legal mechanism through which member systems can directly support the

> network. Since municipalities are often reluctant to make direct payments to one another for services, considerable effort may be required to develop an acceptable mechanism for system member financial support.

HALS' automated circulation project has now been in process for five to six years. The system is still not fully operational, and indeed, it appears that only one library has to date actually run the system in fully operating mode. A major technical difficulty, and an apparent contributor to the delay in full operation, seems to be that the growth of the files has been well above the predicted rate. This has resulted in the system's reaching its capacity earlier than anticipated, with a consequent requirement for upgrading occurring before full operation could be achieved. This became particularly acute when the Bracewell branch of Houston Public went on line in early 1980. The system worked well briefly, but growth from 25 to 50 terminals, plus the addition of this major outlet significantly slowed response time. In this connection it is interesting to note that the primary memory capacity of the S/130 was 256K. Numerous micro computers can now offer such storage. Primary memory is certainly not the only critical factor, but this does give some indication of the rapid development of the micro alternative.

When fully functional the system will offer a full range of on line circulation applications at the seven member library outlets. In addition, dial up facilities will be available to other HALS members. The system incorporates a staff access package, but there appears to be no immediate plan for a full public access catalogue. Neither is a microfiche catalogue as yet contemplated.

The level of inter library loan in HALS is reportedly not very high. There is some feeling among the members that the automated system may increase the level, but no experiential demonstration is yet at hand.

On the whole this system has developed less rapidly than SCOLIS. Many factors account for this, including initial underestimation of system hardware requirements, serious equipment down time, (DataPhase maintenance support was judged on the whole as "less satisfactory than average"), insufficient attention in the planning stage to exigencies of data conversion, possibly exacerbated by inclusion of fuller length records than previously planned, software problems due to the size of the HALS installation, lack of monitoring of the quality of records when first entered and the low hit rate encountered in the process.

A final evaluation of this shared endeavour cannot be rendered until the system has actually been running for some time. The participants appear to remain confident that the initial problems have been overcome, and expect that full operation will be achieved in 1983.

COSTS OF SHARING MINI COMPUTER BASED SYSTEMS

Introduction

The full costs of implementing and running an automated system are difficult to pin down, especially in advance. Both operating and purchase price need to be considered in conjunction with one another, to make a valid comparison between systems. Using a bibliographic utility is low in initial cost but expensive in operation. One turnkey system may be more expensive to buy, but cost considerably less to operate than another. And whatever the quoted price of a standalone system, the actual cost of running it for five years is likely to be much higher, perhaps twice as high. Again, leasing costs may be triple the purchase costs, over five years.

One important factor to consider when comparing systems is the level of the language used in the machine. In general, assembly language is likely to be more efficient, and result in speedier execution of programs. Among turnkey library system vendors, only CLSI uses an assembler language, although some others have written parts of their programs in it. On the other hand, writing of programs in such lower level languages is a long, and difficult process. This may not matter for the library which buys a pre-established system, and intends to make no changes. For a library which intends to modify or add programs - and we feel this will be the next major level of development for libraries - the machine ineffficency of higher level languages will probably be more than offset by the increased productivity experienced by system users. This is largely due to the capacity to build in great machine redundancy with modern VLSI techniques.

In most cases, the concept of a list price means little when buying a mini based library system. The actual price will depend on many factors.

Factors Affecting Prices

Whether the vendor proposal was received in response to an RFP, and was made competitively

The size of the system

The number of participants in the system

Volume and consequent machine capacity required

Functions included

Vendor financial situation

Factors Affecting Prices (continued)

Vendor need for market penetration
(E.g. Is the vendor introducing a new system, and discounting it, or possibly trying to offload the old version?)

Source of hardware

Expertise of the library in analysing its needs, preparing an RFP, and negotiating with vendors.

The best way to determine a real cost is to examine in detail the library requirements, and to issue a Request For Proposals. The following sections are designed to provide a basis for developing a preliminary budget which would allow small to medium sized libraries to determine the real costs of implementing and operating a mini-computer based automated system, either independently or conjointly.

Operating Costs

These costs are also highly variable. In a shared environment, allocation of operating costs among the members must be equitably established. Normally a system would differentiate between the costs peculiar to each individual library, and those common to the system as a whole. In some cases, allocation of system operating costs is based on respective transaction levels, as at North Suburban Library System. In others, the cost is divided evenly among the participants, as at SCOLIS. The components of the operating cost may be listed as follows.

Direct Costs

Communications

- Fixed line costs
- Usage charges e.g. DATAPAC

Software maintenance

- Annually c3% of purchase price

Hardware maintenance

- Annually 5%+ of initial purchase price

User Group Membership

Staff Costs

- Central system staff
- Operators

Direct Costs (continued)

System Updates

Shipping

Insurance

Supplies

Labels

Retrospective Conversion (for a limited period)

Data Loading

Contingency

Indirect Costs

Change in other library routines

Capital Costs

It is in this area, that savings are most likely to be feasible in a shared system, as compared with single library systems. The components of the system will be much the same in either case, although the quantity of some types of equipment will be higher in the shared environment. There are two basic methods of sharing the capital costs. One library may assume the primary responsibility for the system, paying a share of the costs proportionate to those it would incur, if it were to automate alone. This is the way the SCOLIS system was funded. The second method is to share costs equally among the libraries, or proportionally in some way to their size. In all cases, one would expect an individual library to pay for the equipment - typically terminals, printers, etc. - required for its own specific in house use. Preliminary cost estimates for an automated system should include consideration of all of the following items.

Capital Requirements for an Automated System

The following are the basic requirements for an automated system, and should be included in any preliminary costing exercise.

CPU

Terminals

Disk Drives

Tape Drives

Printers

Communications

Miscellaneous minor equipment - interfaces, cables, etc

Installation and Training

Site Preparation

> A reasonable figure would be $10-15000. However, it can exceed $25,000 in older buildings. This figure includes provision for space, power, air conditioning, flooring, fire control and structural modifications. Each of the turnkey vendors has a manual listing site preparation requirements.

Expansion costs

Contingency

Comments on Costs

Although, as a result of automation the total cost of a function may be increased, the transaction cost may go down at the same time. This is a function of increased volume, which is often the consequence of introducing an automated system. Where a system performs a single function, all costs must be reflected against that function. Where several functions are carried out, costs are normally assigned according to the respective number of transactions in each function. This is worth remembering, in light of the fact that such systems may permit the performance of new functions, previously not possible.

Both capital and operating savings may be more evident in a shared environment than in a single library. The reason is that although the overall cost will be greater, it can be shared among the participants, and depending on circumstances, this may offset the communications costs between the sharing libraries. Libraries would normally be responsible for their own communications costs.

Data Loading Costs

These costs are incurred both for retrospective conversion projects, and for ongoing input, as the library develops. Early systems utilized truncated bibliographic records averaging less than 125 characters each. This record size was mandated by the high cost of storage on mainframe systems, and limited capacity of the new mini systems. As the early systems were intended for circulation only, these brief records were suitable, and caused no major problems. As libraries began to add new functions to the systems, however, these brief records began to be seen as inadequate. It soon became apparent that full bibliographic records, to something approaching the MARC standard, would be necessary. Coincidentally, the capabilities, even of mini computers, for storage, began to make full record standards feasible. Libraries became aware that the cost of expanding a brief record was considerable, especially when compared to the cost of storing that full record. The majority of the turnkey vendors have now recognized this fact, and have altered their record structure to approach MARC compatibility.

There are several methods available for record input, depending on a number of factors. These include the following:

Library records are already in machine readable format

In this case, the library may have acquisitions, cataloguing or circulation records in machine readable form. If the format of the records is not acceptable to the new system, a conversion program will have to be written. This process will have a cost attached. Records would be loaded via magnetic tape. In theory, it could also be done over a communications link, or using a disk, but this is not yet a common occurence.

If the library is loading its own autonomous sytem, that is the end of the process. However, if it is loading into a shared system, with an existing data base, particularly if its own records are brief, a search and matching process must be undertaken, to eliminate identical records, except for location information, and to upgrade records where needed. This process, of course, need not apply in a shared system where each participant maintained a separate file.

Library records are not in machine readable format

There is a wide variety of sources of machine readable data for a library which is attempting a conversion. These range from national agencies to commercial vendors and utilities. The basic process involves matching the library's manual data base, with an existing machine readable data base. A critical point here lies in whether the library's manual records include machine access indicators, such as LCCN, ISBN, ISSN, etc. If these are available, location of machine readable cataloguing copy can be made easier and cheaper. The matching process can be done in a variety of ways, by including only the indicator, and if necessary upgrading the full record by a search process carried out on line. Input of the numerical indicators can be done in several ways. A hardcopy list can be input at the keyboard either by the library or by some central agency. That hardcopy could be either the catalogue card itself, or a reproduced list. OCR has been used, but is not currently available.

If the numeric access indicators are not available, the same basic is followed, but author or title will have to be used as indicators. This is a less precise and successful method, usually resulting in greater costs.

Retrospective Conversion

In considering the probable costs of using a given system for a retrospective conversion project, a number of highly variable factors must be carefully examined. They include:

Immediate purpose of conversion - e.g. circulation? This has implications for the depth and extent of record

Possible future uses of the converted data base

Size of File

Ratio of Titles to Items

Time Period

Quality of Record

Combined with preliminary inventory?

Shared or independent

Options available in the system selected

Order of category of materials

Quoted costs

Current Input

The method of record input will have a major effect on the operating cost of any system. As well as the basic question of how records may be input in addition to manual keying (and for this too, the system may be more or less costly, especially in relation to the average amount of time required to input an average record), there are a number of other considerations which should be taken into account. Some of the more salient include:

Manual exceptions

Method of authorities control

Maintenance - record changes

Standards - Shared environment

Existence of interfaces, especially with the major utilities

Summary of Cost Sharing Considerations

Review of the shared systems which formed the basis for this study indicates that the process of implementing automated systems is fraught with the excitement of the unknown. This particularly expresses itself in a tendency for estimated costs to increase, hardware requirements to grow, and time lines to lengthen. However, libraries do automate, and some of them manage to do it together.

The characteristics of successful implementation appear to include realistic preliminary assessment of existing workload and probable future growth, taking into account the impact on demand of the new system itself. In the systems reviewed here, one library seems in each case to have acted as the leader in getting things going, and this too is likely to be a contributor to success.

Accurate costing of existing manual systems, as of planned new ones, accompanied by very detailed analysis of precise equipment and other requirements, and not forgetting a healthy contingency component are also valuable. The hidden costs of existing and new systems must be considered. Governance overhead, other overheads, time of existing staff's involvement in the process, repair of errors in the implementation phase are often elements that are ignored. The development of a plan, including a detailed preliminary review of library requirements, preferably with objective professional assistance, followed by a Request for Information, followed by a Request for Proposal, followed by a Request for Bid, with detailed re-assessment at each phase, is a sensible way for an indivdual library to approach implementation. This careful process is even more critical in a shared project, as it ensures that there are no surprises and helps to ensure that the task has a positive outcome for all participants.

TABLES

Introduction

The following tables list for each of the systems used in the shared systems reviewed in the study, various characteristics which will be of interest to Alberta public library. These systems are:

CLSI LIBS 100

DATAPHASE

EASYDATA

MINISIS

ULISYS

In addition similar data have been tabulated for GEAC and RINGGOLD NONESUCH, which were not reviewed in a shared system context, but are of interest in any event.

Many of the systems reviewed can operate on a number of different hardware configurations. Configurations which would be appropriate to the target libraries of the study, both singly and in selected groupings, have been used as the basis for the tables.

Table 1

Basic Data - EasyData

Item	
Number of Installations	Twelve, of which five are county or regional shared systems.
Hardware Required	Version II operates on Datapoint 6000 256CPU Maximum memory 256k per CPU Maximum ports per CPU is 12
Network Capacity	Can network processors as required
Hardware Cost	$96,000 - $346,000
Programming Language	DATABUS (for applications - Datapoint's own language) Other languages supported
Software Separately?	Yes
Software Cost	$20,000 - Base system (cataloguing, inquiry, - inventory control, microfiche) $10,000 - Acquisitions $20,000 - Circulation (public) $15,000 - Circulation (special) $5,000 - MARC Conversion (Batch) $5,000 - MARC Conversion (On-line)
Functions	Complete integrated library system
Data Conversion	On-line or batch
Communications	In and out
Type of Record	MARC record compatible in Version [illegible]
Comments	Some difficulties in sharing by libraries using different classification systems, as EASYDATA call number record field is at the title level, rather than at the holdings level, so that alternate class numbers can not at present be recorded. The circulation module is not yet in operation in a public library.

Table 2

Basic Data - GEAC

Item	
Number of Installations	GEAC has over 30 installations in libraries. 2 Shared
Hardware Required	GEAC 4000 Maximum memory 640K 32 ports at maximum
Network Capacity	Introduced in 1982
Hardware Cost	GEAC 4000 figures not quoted. Geac 6000 - U.S.$200,000+
Programming Language	ZOPL (High level, for applications software) UGLY (Operates without Assembler for file Management)
Software Separately?	Not generally available
Software Cost	U.S. $20,000+ per module. Circulation - $35,000
Functions	Circulation On line inquiry Cataloguing Acquisitions Integrated?
Data Conversion Method	On line or batch, using utilities or other libraries' files. Conversion software becomes part of the system, for future use. Such software exists for UTLAS, CANMARC, LC MARC and OCLC.?
Communications	Terminal to computer interfaces with bibliographic utilities and other circulation systems. Does not interface with remote data base services such as Dialog
Type of Record	MARC compatible
Comments	Capital Region Library Council, Hartford, Conn. with 12 academic and public libraries is an example of a shared system using GEAC. Note that GEAC was selected by OCLC as the "front end" for its distributed processing system.

Table 3

Basic Data - ULISYS

<table>
<tr><th>Item</th><th></th></tr>
<tr><td>Number of Installations</td><td>10 installations, including one multi type library system (SCOLIS)</td></tr>
<tr><td>Hardware Required</td><td>DEC VAX 11/730 Maximum memory 5000K
Maximum ports 24</td></tr>
<tr><td>Network Capacity</td><td>Yes. See Comments</td></tr>
<tr><td>Hardware Cost</td><td>Not available from company except in connection with specific bids</td></tr>
<tr><td>Programming Language</td><td>BASIC Plus</td></tr>
<tr><td>Software separately?</td><td>Yes</td></tr>
<tr><td>Software Cost</td><td>Varies. The company has quoted as follows:
<table>
<tr><th></th><th>U.S.$</th></tr>
<tr><td>Software</td><td>60,000</td></tr>
<tr><td>Customizing software</td><td>10,000</td></tr>
<tr><td>Implementation services including building of database and training</td><td>20,000</td></tr>
<tr><td>Total</td><td>90,000</td></tr>
</table>
However, SCOLIS is reputed to have paid substantially less.</td></tr>
<tr><td>Functions</td><td>Circulation
On line inquiry
Acquisitions, film booking and serials control are under development</td></tr>
<tr><td>Data Conversion</td><td>Will accept MARC or CANMARC tapes. Online OCLC interface operational. WLN and UTLAS interfaces planned for 1983. Software allows each database to serve in construction of others</td></tr>
<tr><td>Communications</td><td>In and out. Message function</td></tr>
<tr><td>Type of Record</td><td>MARC compatible.</td></tr>
<tr><td>Comments</td><td>SCOLIS installation noteworthy - requirement for different call number formats, loan periods etc.</td></tr>
</table>

Table 4

Basic Data - RINGGOLD (Acquisitions)

Item	
Number of Installations	One. Purdy Library, Wayne State University
Hardware Required	Wang 2200 series. (LVP, MVP, VS) Minimum configuration (one or two terminals) can operate 32K RAM. Installed systems consist of a CPU, disk drive, printer and terminals.
Network Capacity	Systems can be linked to each other and to OCLC or other networks and vendors.
Hardware Cost	U.S.$35,000 (configuration to support 10,000 orders/year. U.S.$67,000 (configuration to support 30,000 orders/year. Both these prices include software, training, installation and support for six months.
Programming Language	Wang Basic2
Software Separately?	Yes.
Software Cost	Not quoted.
Functions	Pre-acquisition searching; order preparation, open order control, vendor reports, claims, cancellations, receiving and invoice processing, in-process control, accessions list, vendor performance analysis.
Data Conversion	Direct key in, or capture from a data base.
Communications	Yes.
Type of Record	Not applicable.
Comments	There are no shared systems using the system yet. Ringgold also markets a micro based circulation system. This will soon become available on mini equipment. It is expected that the two systems will be available as an integrated installation at a quoted price of U.S. $25,000 for the software.

Table 5

Basic Data - CLSI LIBS 100

Item	
Number of Installations	In excess of 200.
Hardware Required	CPU - DEC PDP 11/34 (256k), maximum 40 ports. Disk drives - Control Data 9766 (255MB). Depending on size of system, additional CPU's, terminals, dnives and printers will be required. PDP 11/44 CPU can also be used. Cost - some U.S.$40,000 extra.
Network Capacity	Yes
Hardware Cost	Mini-based U.S.$200,000+
Programming Language	Assembly language
Software separately?	No.
Software Cost	CLSI includes software costs with hardware
Functions	Circulation. On line inquiry. Acquisitions.
Data Conversion	Direct key in. WLN, UTLAS or OCLC tapes can be loaded.
Communications	Yes.
Type of Record	Full MARC record input is reformatted to LIBS 100 format as established by the library.
Comments	CLSI has had the greatest number of installations of which several are shared, including North Suburban Library System .

Table 6

Basic Data - MINISIS

Item	
Number of Installations	In excess of 30, of which almost 20 are in support of bibliographic data bases.
Hardware Required	Software runs on Hewlett-Packard 3000 series. Memory size, number of disk and tape drives dependent on transaction level. Marigold Library System has HP 3000, series 40, 512 KB, one 404 MB disk drive, one 1600 bpi tape drive.
Network Capacity	None specified, but MINISIS can integrate a library's different automated systems, and has some interface capacity.
Hardware	Cost varies with configuration. HP 3000 costs c. U.S. $40,000+
Programming Language	Uses Multi programming Executive (MPE) with HP's System Programming Language (SPL), a high level language.
Software separately?	Yes.
Software Cost	$10,000 (Canadian non-profit organizations. This is an 80% discount from the regular price)
Functions	Acquisitions and cataloguing. Authority control, and catalogue production.
Data Conversion	Accepts magnetic tape (ISO 2709 format). Accepts CANMARC and MARC tapes. Direct key in.
Communications	In house communications
Type of Record	MARC format accepted and reformatted to a simplified MARC record.
Comments	Very flexible. MINISIS is a generalized information management system. Marigold Library System is an example of a shared system using MINISIS.

Table 7

Basic Data - DATAPHASE

Item	
Number of Installations	Over 50
Hardware Required	Data General S/130, S/140, S/250, or TANDEM. Control Data disk drives can be mounted, in place of Data General equipment, for greater capacity. Can also be mounted on Data General NOVA micro computer
Network Capacity	Yes
Hardware Cost	Typical ALIS II system U.S.$200,000+ Typical ALIS IIe system U.S. $500,000+
Programming Language	For ALIS II - MIIS-MUMPS (applications) ALIS IIe - COBOL.
Software separately?	Yes, but more expensive, than with turnkey system
Software Cost	Not specifically quoted, but total software package costs U.S. $55,000. This includes all future software modules.
Functions	Circulation. On line inquiry. Inventory control. Serials control for 1983.
Data Conversion	Direct key in. Various on line interfaces available. Tape loading supported
Type of Record	MARC format
Comments	Alternative equipment options are worth exploring, as DataPhase has experienced some difficulty with adequate secondary storage on Data General disk drives.

APPENDIX

SPOKANE COOPERATIVE LIBRARY INFORMATION SYSTEM (SCOLIS)

MEMORANDUM OF AGREEMENT
FOR THE
PROVISION OF AUTOMATED SERVICES

SPOKANE COOPERATIVE LIBRARY INFORMATION SYSTEM (SCOLIS)
MEMORANDUM OF AGREEMENT FOR THE PROVISION OF AUTOMATED SERVICES

THIS AGREEMENT is made, effective as of the ________ day of ____, 1979 by and between the Spokane County Library, hereinafter referred to as Spokane County Library and ____, hereinafter referred to as the Cooperative User, both not for profit organizations organized and existing under the laws of the State of Washington,

WITNESSETH:

WHEREAS, the participating institutions identified above are public agencies for purposes of R.C.W. Chapter 39.34, Interlocal Cooperation Act; and whereas all may have previously signed an Agreement creating the Council of Spokane Area Libraries; and WHEREAS, pursuant to the powers vested in the public agencies by Chapter 39.34, each of them has the authority to enter into an Interlocal Cooperation Agreement with other public agencies in order to provide services that will best accord them mutual needs.

NOW THEREFORE, in consideration of the mutual covenants and undertakings herein, the parties agree as follows:

PART I - DESCRIPTIVE INFORMATION & DECLARATION OF PURPOSE:

SPOKANE COUNTY LIBRARY, having recently solicited proposals and selected a vendor for an automated circulation system, recognizes the desirability of making such a system available for use by other not for profit libraries in the Spokane Area. Spokane County Library will extend to Cooperative Users the full range of services available from its automated system, subject to the terms and conditions of this Agreement.

PART II - TERM OF AGREEMENT:

This agreement shall be in full force from the day and date indicated above and shall continue for an initial term of one year. The agreement shall continue in force from year to year unless one or both parties shall elect to terminate the agreement as provided for in PART III - CANCELLATION.

PART III - CANCELLATION:

The agreement may be cancelled by either party at the end of the initial one (1) year term or at the end of any one (1) year renewal, provided that at least six (6) months written notice be given to the party so affected. Spokane County Library and the Cooperative User both recognize that substantial capital investment has been made by each in acquiring the necessary system hardware and software and recognize that cancellation of this agreement without good cause may cause substantial hardship for both. It is understood by Spokane County Library and the Cooperative User that it is the good intent of both parties to keep this agreement in force for a period of six (6) full years.

PART IV - OWNERSHIP & MANAGEMENT OF THE SPOKANE COUNTY AUTOMATED LIBRARY INFORMATION SYSTEM:

It is understood that Spokane County Library shall have full ownership rights to all central system hardware and software, subject to the terms and conditions of Spokane County Library's contract with Universal Library Systems, Ltd., Vancouver, British Columbia and shall make the services of such a central system available to the Cooperative User in consideration for payments received from the Cooperative User according to EXHIBIT A of this agreement.

It is understood that the Cooperative User shall be responsible for providing, at its own expense, all computer terminals, modems, and communications equipment necessary for connection to the central system to be housed at Valley Library, East 12004 Main, Spokane, Washington. It is further understood that the Cooperative User will purchase equipment to specifications furnished by the Spokane County Library and the Cooperative User will hold title to any equipment so purchased. Spokane County Library will also assist in the purchase of such equipment or may, in fact, purchase such equipment on a reimbursable basis for a Cooperative User when said User shall so request.

PART V - SYSTEM MAINTENANCE:

Spokane County Library, in consideration for an annual payment received from the Cooperative User, as specified in EXHIBIT A, shall contract to maintain all central system hardware and software in good operating condition. The Cooperative User shall be responsible for the maintenance of terminals, modems, and other communications devices necessary for connection to the central computer system.

PART VI - SERVICE AVAILABILITY:

The automated system will be available for use by the Cooperative User for circulation and other transactions on a schedule of hours shown in EXHIBIT B. Spokane County Library, through its contracts for hardware and software maintenance, shall maintain the equipment in such a fashion as to provide for downtime and response time not exceeding the limits specified in these contracts. No liability shall be assumed by Spokane County Library, however, if these limites are exceeded. On occasion, it may be necesary to temporarily suspend system availability because of operational or maintenance requirements. Whenever possible, Spokane County Library will provide the Cooperative User with prior notice of system unavailability. Such suspension shall not be deemed an unreasonable prevention or postponement of system use by the Cooperative User.

The Spokane County Library, working with the Cooperative Users, will develop a plan for a substitute method for the loan and recovery of materials in the event of a catastrophic system failure with extended periods of downtime. Such a plan is to be developed.

PART VII - STANDARDS FOR BIBLIOGRAPHIC DATA:

The automated system has the ability to read and edit bibliographic data in MARC II format from Washington Library Network and OCLC, Inc. magnetic tapes. Data will be stored in an abbreviated format. It is required by Spokane County Library that all records input into the system by Cooperative Users comply with the specifications established in EXHIBIT C of this Agreement.

The User's Council, as provided for in PART VIII - COOPERATIVE USERS COUNCIL, may act, upon request of one or more members to suspend the right of a User to input bibliographic records into the database if that User has consistently failed to comply with those standards presented in EXHIBIT C. Such suspensions may last for up to thirty (30) working days and will require an affirmative majority of Council for implementation. During said suspension, the User so affected shall undertake whatever remedial measures may be required to bring their bibliographic data into compliance with the standards of EXHIBIT C.

PART VIII - COOPERATIVE USERS COUNCIL:

A council shall be created for the purpose of advising the Spokane County Library on matters relating to the operation of the shared automated system. Each full-share Cooperative User shall be entitled to designate one representative to sit on the Council. Each full-share Cooperative User shall be entitled to one vote on any Council deliberations. The Council will advise Spokane County Library on matters relating to the operation of the shared automated system including standardization of operating procedures, hours of services, equipment needs, service standards, annual fees, and other matters considered relevant by the Council.

The Council may call in a consultant, to be selected jointly by the Spokane County Library and the Users Council, to review the management and operation of SCOLIS, upon majority vote of the Council. The Consultant, after completing his review, shall issue a report to the Users Council and the Spokane County Library which will include his analysis of operations and his recommendations for changes, where needed. The cost of such a consultant will be shared equally by those institutions requesting the consultant's evaluation.

The Board of Trustees of the Spokane County Library retains final authority for decision-making related to the automated system and its operation.

The Council will meet at least quarterly. An annual meeting will be held each September for the purpose of electing a chairman and a secretary and to formulate plans for system enhancements and changes for the coming year. Each half-share member shall be entitled to designate one representative to sit on the Council. Each one-half share member shall be entitled to one-half vote on any Council deliberations.

PART IX - INSTALLATION & TRAINING:

It is understood that the responsibility for the installation of all equipment purchased by the Cooperative User for use with SCOLIS shall rest with Universal or its designee.

The initial general training of the Cooperative Users staff shall be the joint responsibility of Universal and the Spokane County Library. Spokane County Library shall assist in the training of said staff to insure a common level of knowledge about the use and operation of the system. Spokane County Library will also coordinate that portion of staff training related to the shared use of the system.

Spokane County Library, under Universal's direction, shall be responsible for loading the Cooperative Users database into the storage of the central system and integrating it with that information already contained in the storage of the system. The Cooperative User shall have full responsibility, however, for initially getting all its information into a form which can be manipulated by electronic equipment or to manually key-in all data, according to standards presented in EXHIBIT C or furnished by Universal Library system.

PART X - ADMISSION OF NEW COOPERATIVE USERS:

Spokane County Library shall have the option of admitting new Cooperative Users to SCOLIS, provided that system modifications may be undertaken where required, to insure that a significant continuing degradation of system performance does not occur. Any new User so admitted shall pay the full cost for any required modifications to the central system which may be required, pay a hardware integration fee of $50,000 to the Spokane County Library, and be responsible for purchasing all terminals, modems, and communications equipment necessary for connection to the central system. The newly-admitted Cooperative User shall also be responsible for the installation of equipment, training of staff, and loading of the database, as specified elsewhere in the Contract at a fee to be negotiated with Universal Library Systems, Ltd.

PART XI - DUTIES & RESPONSIBILITIES OF SPOKANE COUNTY LIBRARY:

Pursuant to this Agreement, and with the advice of the Cooperative User's Council, the Spokane County Library shall:

1. Manage the automated system purusant to the terms and conditions of this Agreement under direction of the Board of Trustees, with the advise of the Cooperative Users Council.
2. Regularly review the operations of the system and evaluate its performance, developing plans for modifications, where necessary.
3. Solicit, receive, and disburse all monies received from Cooperative Users.
4. Purchase and maintain all central system equipment and house such equipment in a suitable environment.
5. Report regularly to the Board of Trustees and the Cooperative User's Council, the status and performance of the automated system and disposition of any monies recieved or owing.

6. Maintain a special fund called the "SCOLIS FUND" into which all monies shall be deposited and from which all monies shall be paid. This fund shall be audited regularly, when the general accounts of Spokane County Library are audited. The audit report will be available for review following its publications by the Washington State Auditor's office. In addition to the Audit Report, the Spokane County Library will furnish to all Users a regular quarterly financial report for this fund.

7. Maintain and enforce rules and regulations necessary to coordinate orderly use of the system by the Cooperative Users.

8. Coordinate the purchase of remote Cooperative User equipment, including terminals, modems, and communications and other devices as may be necessary.

9. Plan for and coordinate this implementation of system modifications and enhancements as may improve the operations or functions of the system

10. Purchase, on a fully reimbursable basis for Cooperative Users, all suplies, forms, paper, tapes, cards, etc., which may be required to provide the services of the automated system for the Users.

11. Attempt to maintain sound relationships with other libraries, networks, utilities or business concerns, where necessary, to provide specified automated system services.

12. Maintain adequate insurance coverage, including business interruption insurance, on all central site equipment and communications devices.

13. Pay all utilities, except telephone line charges, as may be incurred in the operation of the system.

14. Employ all personnel needed to maintain and operate the central site utility.

FAILURE TO COMPLY with these rules and regulations will constitute a breach of this Agreement by Spokane Country Library and, as such, shall be subject to the remedial provisions of the Agreement.

PART XII - DUTIES & RESPONSIBILITIES OF COOPERATIVE USERS:

Pursuant to this Agreement, the Cooperative User shall:

1. Participate in the use and operations of the automated system under the terms and conditions of this contract and the rules and regulations which may be adopted by Spokane County Library.

2. Be liable for hardware upgrade change, a software installation charge, and for all charges related to the acquisition of remote hardware, including computer terminals and communications equipment necessary to communicate with the central site. The Cooperative User shall pay all Washington State Sales Taxes on purchases, where applicable.

3. Be liable for an annual payment to Spokane County Library for the costs of personnel, supplies, and materials, utilities, and insurance, administrative and accounting services, central hardware and software maintenance, and other operating expenses. The annual payment, as well as those payments specified in Paragraph 2 above, shall be due and payable accoring to the payment schedule presented as APPENDIX D of this Agreement.

4. Regularly review the operations of the system and advise Spokane County Library in writing when modifications or improvements appear necessary.

5. Purchase and maintain all remote terminals, modems, and communications equipment and telephone lines necessary to communicate with the central site. All equipment so purchased must comply fully with the Spokane County Library specifications. The automated system, as installed, should provide sufficient capacity for the addition of terminals and required communications equipment by Cooperative Users. The addition of terminals over and above the number specified in APPENDIX E, EQUIPMENT SCHEDULE, must be authorized in writing by Spokane County Library at least ninety (90) days prior to the anticipated date of installation of said equipment.

6. Pay all monies owed Spokane County Library when due.

7. Participate in the cooperative purchasing of supplies and materials required for system operation.

8. Input all data into the system according to the rules presented in EXHIBIT C, STANDARDS FOR BIBLIOGRAPHIC DATA.

9. Regularly participate in the meetings and deliberations of the Cooperative User's Council.

10. Keep those records and statistics which may be required by Spokane County Library to document the performance of the system.

FAILURE TO COMPLY with these rules and regulations will constitute a breach of this Agreement by the Cooperative User and, as such, shall be subject to the remedial provisions of this Agreement.

PART XIII - CORRECTIVE & REMEDIAL MEASURES:

Whenever either party believes that the other has committed a remediable breach of any material obligation set forth in this Agreement, it may give the other notice to that effect with reasonable specificity. The other party shall use its best efforts promptly to remedy the breach and shall inform the party so giving notices of the nature of the remedial action planned and taken or will respond to any such notice, with an explanation that sets forth reasonable cause for the breach. When a breach does exist that will not be remedied within thirty (30) days after the other party receives notice of it, the party giving the notice shall be entitled to seek appropriate relief under this Agreement or otherwise under the law, which includes, without limitation, termination of the terms of the Agreement for cause and without liability for that termination.

PART XIV - APPLICABLE LAW:

This Agreement shall be governed by, subject to, and construed according to the laws of the State of Washington, with venue to lie in Spokane County, Washington.

PART XV - ASSIGNMENT

This Agreement may not be assigned by either party, in whole or in part, without the express prior written consent of the other.

PART XVI - LIABILITY:

Each Cooperative User under this Agreement agrees to hold every other Cooperative User harmless against any liability caused by the negligent or intentional acts of each member's respective employees or agents which results in injury to any person, or property damage, or any other harm arising from any negligent or intentional actions that may result from the participation by the Cooperative User in the automated system, as established in this Agreement.

PART XVII - ARBITRATION:

If any Cooperative User considers that any assessment levied by the Spokane County Library to be excessive or any rules or regulations governing the operations, and shared use of the system to be unfair, Spokane County Library shall be notified by the Cooperative User in writing that the amount is disputed, or rule or regulations is unfair, within ten (10) days of the member institution's receipt of the assessment or notice of rules and regulations for the ensuing year. If Spokane County Library and the Cooperative User cannot then resolve their differences within thirty (30) days after Spokane County Library has received the User's protest, either party may then request arbitration in accordance with the procedures outlined in R.C.W. Chapter 7.04. The arbitrator shall be one who is mutually selected by both parties; and he shall be selected within not less than twenty (20) days after the initial request for arbitration. After an arbitrator is selected, he shall hold a hearing and render final judgment, which shall be binding upon both parties, within not later than sixty (60) days after the arbitration has been selected.

PART XVIII - CONFIDENTIALITY OF DATA:

The circulation records of all Cooperative Users are to be considered CONFIDENTIAL regardless of the source of inquiry. Employees of the Cooperative Users shall, of course, have access to such records to provide for the orderly operation of each library, however, such records shall not be made available to anyone else except pursuant to such process, order, or subpoena as may be authorized by law.

Upon receipt of such process, order, or subpoena, consultation shall be made with the User's legal officer to determine if such process, order, or subpoena is in good form and if defects are noted, insistence shall be made that such defects be cured before any records are released. The legal process requiring the production of circulation records shall ordinarily be in the form of subpoena duces tecum (bring your records), requiring an employee of the library to attend court or the taking of his or her deposition and may require him or her to bring along certain designated circulation records. The Director of Spokane County Library may release circulation records without process, order, or subpoena, after consultation with the Director, legal officer, or designee of the loaning library, if in his judgment, a condition or grave emergency exists which can be remedied by the release of such circulation records. Any problems or conditions relating to the privacy of circulation records which are not provided for in this policy statement shall be referred to the Director of the applicable library for resolution.

PART XIX - WARRANTIES:

A. HARDWARE

All hardware, whether for central site or remote installation, shall have a full perpetual warranty by Digital Equipment Corporation, provided the monthly hardware maintenance contract remains in force. Spokane County Library will contract for such maintenance service on behalf of the Cooperative User on a fully reimbursable basis for all remote site equipment including terminals, modems, and necessary telecommunications and other equipment. In consideration of the annual operations payments made by the Cooperative Users, Spokane County Library will maintain a monthly maintenance contract on all central site hardware. Spokane County Library is not responsible for any incidental or consequential damages of whatever nature resulting from the Cooperative Users use or operation of said remote site equipment or from acts of God, war, civil strife, fire, water damage, smoke damage, or power fluctuations.

A Cooperative User may also contract independently for maintenance of remote site equipment at its own expense. The Cooperative User will remain liable for an annual maintenance charge, payable to the Spokane County Library for its share of the central site and software maintenance fees. If a Cooperative User contracts independently for maintenance, Spokane County Library, or Spokane County Library's maintenance vendor will incur no obligation for the operation of said equipment independently maintained.

B. SOFTWARE

All automated system software shall have a full perpetual warranty by Universal Library Systems, Inc., provided the monthly maintenance contract shall remain in force with Spokane County Library. Spokane County Library, in consideration of annual operations payments by Cooperative Users, shall maintain such a software maintenance contract at all times.

Spokane County Library shall make every attempt to cause the automated system to operate to the standards specified in this Agreement, however, Spokane County Library offers no warranty, expressed or implied, that deviations from these standards will not occur.

C. TELEPHONE LINES

The Cooperative User recognizes that Spokane County Library does not control, therefore cannot warrant, the telephone lines used to communicate data from a remote site to the central computer.

D. INTERRUPTIONS OF SERVICE OR LOSS OF DATA

Spokane County Library will regularly duplicate, at least weekly, all data maintained in the automated system database and store all such duplicated tapes or disk pacs in a location physically apart from the site of the central automated system. Furthermore, Spokane County Library will maintain a daily tape log in the event that a disk malfunction occurs, so that the day's circulation transactions can be reconstructed.

There is the chance, however remote, that some or all of the data may be lost or destroyed. Spokane County Library does not warrant that such a data loss will not occur and the Cooperative User agress to hold Spokane County Library and its employees and agents harmless for such a loss not the result of willful, malicious effort.

PART XX - INSURANCE:

Each Cooperative User will be expected to maintain insurance or to self-insure if they wish, all system equipment housed within the confines of their facilities. Spokane County Library will maintain insurance on all central site equipment.

COOPERATIVE USER:	
______________________________	SPOKANE COUNTY LIBRARY:
BY:______________________________	BY:________________________
DATE: __________________________	DATE:______________________

COMPARATIVE COSTS
FOR CATALOGUING SERVICES

A Study for

the

Alberta Public Library Directors' Council

by

Dr. David R. Williams

and

Derek R. Francis

LMG The Library Management Group Inc.

New Westminster, B.C.

March 1983

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EXECUTIVE OVERVIEW

The study is concerned with costs of cataloguing from outside the library. The costs of obtaining cataloguing copy from UTLAS and other bibliographic utilities, as well as a number of commercial vendors are discussed. Components of the cataloguing process are outlined, and various hidden costs explained.

Discussion of the various sources includes analysis of the scope of their data bases, methods of access, prices, options available, retrospective conversion considerations and other matters.

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INTRODUCTION

For seven decades this century the card catalogue has stood, remote and aloof, as the pre-eminent method of recording library holdings. During much of that period, each library created its own catalogue, without much concern for developments elsewhere. With the great increase in number of publications since the Second World War, the greatly increased costs of creating cataloguing copy and the increasing pressure for library co-operation, this method of providing access to library holdings became increasingly inadequate. Two lines of development toward solving the problem have been pursued. The first has been an intense examination of the physical form in which the catalogue is most effectively and most efficiently presented. The second has been the attempt to avoid duplication of effort in the creation of the basic catalogue record itself. Much of the work of the Library of Congress, the National Library of Canada, the British Library, and the various national library associations has been aimed toward this end. This study is primarily concerned with the latter.

There are several sources of cataloguing data, both machine readable and in various hard formats, available to Canadian libraries. They include automated and traditional commercial vendors, more or less mutually co-operative utilities, and national agencies, such as LC, and NLC. The data are available in a wide range of prices. In the case of the commercial vendors, the provision of cataloguing information is generally tied to the acquisition of materials from the same vendor. As a result, the true cost of cataloguing is difficult to ascertain, complicated as it is by the existence of varying discounts, and processing options. Generally the commercial vendors base their cataloguing on the data made available from the national agencies. For this reason, many of the problems of differing cataloguing standards are beginning to disappear. To a degree the same is true in the utilities, though here the input of original cataloguing by clients may sometimes dilute the quality of the data base.

There is a general difficulty in acquiring cataloguing data for items other than print materials, particularly for many of the commercial vendors. Such materials are not yet fully covered in the machine readable output of the national agencies, although this situation is being remedied. As libraries begin to buy more and more audio visual formats, this could become more of a problem than it is now. Original cataloguing of these materials is expensive.

Once a price for the purchase of cataloguing data from some source has been established, it does not necessarily follow that the true full cost of providing a library's catalogue has been established. Various internal costs will likely be incurred. They may include the cost of placing the order for the copy and receiving it, card sorting, error correction, authority control, if not provided by the system, construction of the reference network, original cataloguing for "non-hits", card filing and catalogue maintenance. Such costs can generally be established only by a fairly intensive process of in-house self-study. Furthermore the apparent commercial costs may be magnified or diminished by the library's volume of acquisitions, and by the discounts it has succeeded in negotiating. In addition, of course, the library may have to acquire cataloguing copy for the material not purchased from the jobber, or for material purchased therefrom, for which cataloguing copy is not supplied, and the costs of these additions have to be included in any comprehensive calculation.

A library wishing to compare the cost of cataloguing services from a number of sources needs to take into account several factors. They include:

1. The ability of the library to provide various supportive functions in house. The greater the number of functions - such as authority control - to be supplied by the vendor, the greater the costs.

2. Whether or not processing charges are included, and whether they are optional.

3. The number and kind of options available.

4. Whether or not machine readable data is required by the library, and available from the vendor.

5. Whether or not the library wishes to have on-line access to the system, for original input.

6. The degree of data correction (so that the purchased catalogue record exactly matches the acquired item) that can be tolerated.

7. Whether or not the library ever expects to undertake a retrospective conversion project.

8. How many catalogues are required to be maintained, for example for branch libraries. This will affect the number of card sets purchased.

9. Completeness of cataloguing coverage provided by the vendor. For example, some vendors do not provide copy for audio visual materials. At least one vendor reserves the right not to catalogue materials they feel do not warrant it. Others may have problems with Canadian publications.

10. The turn around time that can be expected from the vendor.

This study examines the nature of the services available, and the prices therefor, from several commercial vendors, one utility and a national agency. The bibliographic utility examined is UTLAS, a Canadian example. Baker and Taylor, Brodart, MARCIVE and the National Book Centre, constitute the commercial vendors. The National Library MARC Distribution Service is also reviewed.

The objective of the study is to compare, as far as possible, the price for various cataloguing services from each of these sources, and to provide some evaluative comparison in terms of the nature and extent of the services available. A number of tabular presentations are included.

UTILITIES

Introduction

Perhaps the most effective and popular method of obtaining cataloguing copy in machine readable form is to make use of a bibliographic utility. The success of both UTLAS and OCLC, and the rise of competing utilities testify to this. The major reason lies in the size and comprehensive coverage of the data base which the utilities can provide. However, size and comprehensiveness are not the only two factors to be considered.

An ideal cataloguing system has the following characteristics:

A high "hit rate" or percentage of titles to be catalogued that can be found to exist already in the data base. This is a function of both the data base, and the characteristics of the library searching it.

Cataloguing of consistently high quality and conformity with the latest cataloguing code. Apart from the source files, this is governed by the standards of the utility and the quality of original input from the member libraries.

On-line authority control. This recent service development is not yet fully implemented on all utilities. It is expensive to initiate, but essential to the maintenance of quality, particularly in a shared environment.

Flexible on line editing capability. Some utilities are easier to use than others, hence less demanding of staff time.

The ability to do original cataloguing easily on-line. This too can impact on staff costs.

Out-put in various forms such as cards, microform, magnetic tape and on-line access. The availability, costs, turn around time and availability of options are all important. In particular the option to use an alternate vendor for production of products from utility tapes is sine qua non.

Even so, the main requirement for such a system is a database with several million titles. At one time it appeared that libraries would be able to satisfy this need by subscribing to the Library of Congress or the National Library of Canada's machine readable cataloguing records. But in the past decade we have come to realize the National Library simply cannot begin to keep up with publication output and we are seeing the development of shared cataloguing networks to which many libraries contribute cataloguing data in return for being able to take cataloguing data back. These bibliographic utilities still mount the MARC family of tapes but they are supplemented by contributed cataloguing.

The bibliographic utilities have all utilized mainframe computers because of the large size of the bibliographic database and the state of computer technology when the first such utility, Ohio College Library Centre (OCLC), began its pioneering network effort in the late 1960's. This requirement for expensive hardware installations was one of the prime reasons for the rush to utilities during the sixties and seventies, since relatively few libraries could afford the cost of mounting data bases of such size.

The utilities have themselves become de facto networks, as libraries of many kinds across the continent have participated. The resulting data bases have become recognized as capable of supporting more than simple catalogue generation, and the utilities have begun to add additional functions. In fact, in both Canada and the U.S. these developments have in some ways superseded the activities of the national libraries, although these continue to be responsible for creation of the basic national data records.

The major networks are, as already mentioned, OCLC, the pioneer, The Washington Library Network (WLN), The Research Library Information Network (RLIN) and the ubiquitous UTLAS. UTLAS has been in operation for more than 10 years and is the major system offering service in Canada. There are well over 100 members using UTLAS services in this country, and the system has been sold in the U.S. and Japan. The UTLAS data base now holds about nine million records composed of LC MARC records dating from 1968, National Library of Canada records, National Library of Medicine records, National Library of Quebec records, British Library records and records contributed by members. Any type of library may join the system, with current membership generally being shared between academic and public libraries.

Users of the utilities may rent or in some cases, own terminals, printers and communication lines. The pricing policies vary from one to the other. For example, after the initial set-up fee, UTLAS has a unit pricing structure, with each unit of service priced separately to encourage efficient utilization of the service. The average for an Alberta library to use the UTLAS services would be about $5 - $6.00 per title added to the collection. This cost would pay the rental on terminals, printers and communications lines, rental for computer use, records and storage, and the product that is selected (usually a COM catalogue).

In British Columbia, interior users face a higher charge because cheap communication lines (if they can be described as cheap) exist only to Lower Mainland centres and are just now being extended to various interior points. If a library does not have access to a cheap data route line it is required to link to the nearest data route point by means of a dedicated long distance telephone line. Several libraries can share the cost of such a long distance telephone line but it could still add a dollar or so to the cost of cataloguing a new book.

A very attractive aspect of automation using bibliographic utilities is the small capital investment required on the part of the library. There is no hardware to buy, and for a small library the start-up cost may be as little as a few thousand dollars. Catalogue records created on the system may be loaded with a translation program, into any one of a variety of circulation systems. If a library has automated several areas of its operations the goal is to ensure that it does not end up creating several databases all separately keyed in.

Canadian libraries have the theoretical option of using at least three different on-line bibliographic utilities: The University of Toronto Library Automation Systems, OCLC and the Washington Library Network. The British Columbia Library Network is in the process of implementing a trial installation of WLN software in the province. While BCLN may eventually be a factor in the provision of on-line cataloguing information it is not yet so. Each of the utilities operates a different pricing algorithm, emphasizing variously records used, operations undertaken, connect time, or products. While the pricing structures appear vastly different the end result is almost always the same. In fact a recent study by Library Technology Reports indicates this very fact. As noted above, Canadian libraries theoretically have a choice of the major on-line vendors, but in practical terms UTLAS is almost the only option. Only a few Canadian libraries are using the on-line services of the major U.S. utilities. This may be for a variety of reasons, including the difficulty of tying oneself to a major library service based outside the country, with all the problems entailed in dealing with fluctuating currency levels, cross national contractual and legal differences, and a desire to avoid "buying around".

For this reason, only the Canadian utility is examined. The following section reviews the service offered by the University of Toronto Library Automation Systems (UTLAS).

UTLAS

UTLAS is at present an independent corporation, affiliated with the University of Toronto, and governed by a Board of Directors appointed by the university. It originated in the university library's automation of its own systems. In 1959, the library began converting its catalogue records into machine readable form. During the 1960's various attempts to set up an Ontario consortium in conjunction with this enterprise, had been initiated. By the mid 1970's, a consortium named UNICAT/TELECAT was the main user of the university system. The university library was a member of UNICAT.

Subsequently UTLAS, still at this time a division of the university library, began more actively to vend its system across the country. In the late 1970's it was established as a separate division of the university, and later as a semi-autonomous agency. Meanwhile it had grown to be one of the largest utilities in the world, with a very extensive and still growing range of services. An interesting aspect of UTLAS's approach to networking is its diclaimer of any copyright to the data base itself, which stands in contrast to OCLC's present attempt to copyright that data base, a move which has generated great controversy among its members. UTLAS takes the position that the data bases, apart from the source files, belong to the members, who may provide on line access, sell or give away copy, as they wish. One reason for this difference of approach is doubtless to be found in the differing file architecture. OCLC's data base is integrated, whereas UTLAS provides separate linked files.

UTLAS does not supply cataloguing data in simple response to an order. It is unlike a commercial vendor in this respect. The library must maintain a bibliographic file at and a data link to UTLAS. The utility provides fully automated on line library services including shared cataloguing, ordering and product generation. The system now services over two hundred libraries of many kinds, in several countries, including several libraries, book jobbers, commercial cataloguing enterprises, and other networks. It has become the de facto Canadian library network. The centre of the system is catalogue support, known as CATSS, and it provides the following functions:

Data base searching
Interactive on line editing
File creation and data base management of
  individual, shared and linked files
Authority control
On line ordering to vendors
Product generation

There is also an on line retrieval function for reference and electronic messaging. UTLAS is marketing an in house mini system named INNOVACQ, designed by Innovative Interfaces, which enables a library to link to the UTLAS bibliogaphic data base, and ACCORD. ACCORD is the basic UTLAS acquisitions package, accessed on line from a standard terminal, providing basic order preparation. INNOVACQ, however, provides a full range of acquisitions functions including fund control. While this systen is now available, its use is not widespread, partly because of its cost. An earlier attempt to implement a circulation system, has since been discontinued. Nor is there as yet a functioning inter library loan module. UTLAS offers an operational authority control system.

This utility possesses the largest machine readable data base in Canada, and one of the largest on the continent. For any library comparing alternative methods of obtaining cataloguing data, it is a possibility that must be examined.

Scope of the Data Bases

The data base contains about 9,000,000 records, including LC Books, LC Serials, LC Films, COMARC, CAN/MARC Books CAN/MARC Serials, NLM MARC, Bibliotheque Nationale du Quebec MARC, plus records input from member libraries. The authorities data base contains 575,000 records, consisting of LC Names, LC Subjects, CAN/MARC Names, The Repertoire Des Vedettes-Matiere (Universite Laval) plus 275,000 name authority records contributed jointly by the SHARAF group of large research and public library clients.

The major strengths of the UTLAS data base are its Canadian and its client contributed content.

Access

The usual numerical access keys are available, together with author, title and Boolean search capability. (Boolean search means the capacity to combine various search topics in a variety of mutually combinative and/or exclusive ways, rather than simply by single topics). The total UTLAS data base is held in numerous files, which are linked in fairly complicated ways. Client input is held in client files, but also combined in UTLAS' ORIG file. Access to the non-public domain records may not be entirely automatic. As noted before, in the UTLAS system, clients have copyright to their files, and may restrict or charge for access to them.

Cataloguing information

All source records are in the MARC format received from the national cataloguing agencies. Original input is to the MARC compatible UTLAS standard. The result is that there is a high degree of consistency in the data base, increased by the existence of the authority control system.

Options

A library may simply derive records from UTLAS and do something with them, or it may utilize the authorities facility to control name and subject formats, and to create a reference network within any product generated. Use of this facility adds about $1.00 to the cost per record.

Many product options exist, and a library must establish a "profile", delineating the products to be received. The use of a limited number of standard profiles brings some price advantages. Similarly with regard to modification and depth of cataloguing data, some flexibility does exist, but adherence to standard patterns is price advantageous.

Retrospective conversion

There are three alternative methods of carrying out RECON. On line input can be done by the client. A staff member would sit at a terminal with shelf list to hand, and type in search keys. If a hit were generated, the copy would be utilized. Non hits would be input in full manually.

A second alternative is on line input by UTLAS. In this case, the library shelf list is sent to UTLAS, "drawer by drawer", for conversion by UTLAS staff. There are four price possibilities: $1.00, $2.50, $4.75 and $5.75 per title reflecting the exactitude of record matching desired, as well as editing undertaken. Any no hits at the upper three price levels are coded and input by UTLAS for the same unit cost.

The third method is by submission of fully coded CANMARC or LCMARC compatible format records for incorporation into CATSS in order to build a consolidated data base. After an initial one time set up fee of $1125, records are incorporated at a charge of $0.17 per record.

Original cataloguing input

Ongoing library cataloguing is done on line. For most libraries the large proportion of their cataloguing will already exist in the data base. It is impossible to predict what the exact proportion would be, but estimates for public libraries range from 70% - 90% hits. At the upper range this would be a very satisfactory succes rate. The remainder must be entered at the keyboard, following the format built in to the system.

Hardware Requirements

Central System Hardware. UTLAS is presently installed on XEROX equipment, specifically SIGMA 7's. For two years the company has been in process of rewriting the programmes so that they will run on Honeywell equipment. No firm date has been announced for completion of the change.

Customer Hardware. UTLAS uses teletype-compatible asynchronous CRT terminals. Typical would be VUCOM terminals. These run at 300 baud, and can use full-duplex dedicated or dial-up lines. DATAPAC, a packet switched network, which has the potential to reduce communications charges, is supported at present on an experimental basis. The terminal would normally have a printer attached. For users at low volumes, a CRT may not be necessary, just a printer. Ancillary equipment, including modems, cables and the like are also required. The hardware can be leased or bought.

Prices

The average ongoing cost of using UTLAS is $5 - 6.00 per title, depending on whether the authorities system is purchased. This average cost is based on the whole spectrum of a library's possible cataloguing activity - specifically it includes "hits", added copies, added volumes and original cataloguing input. It inludes also the product costs, and equipment and communications costs.

For a library using leased equipment, the initial implementation cost would be about $6,000. This includes file set up, hardware installation and product profile set up. For a library purchasing 5000 titles annually there would then be yearly recurring costs of $30,000 +. This yearly charge could be reduced by about $2000, if the terminal and printer were purchased, at a cost of approximately $2500.

An UTLAS terminal can be used to handle about 12,000 items yearly, if used seven hours a day. This can be extended by shift work, with the increased salaries entailed. However, there are limits to this, because of the time differential between Alberta and Toronto, and because UTLAS does not operate the system 24 hours a day. The implication is that for a library or libraries acquiring substantially more than 12,000 titles annually, the costs of an additional terminal, operator, and communications would be encountered. Conversely, per item costs are reduced if the terminal is used to its full capacity, and this is a reason for co-operative ventures between small libraries.

General Comments

UTLAS' position as the only country wide Canadian network gives it a natural advantage in the competition for the library cataloguing dollar. On the face of it, however, the service is not cheap. The average, all-inclusive cost per title, to use UTLAS to provide a full catalogue service is between $5.00 and $6.00. This is compared with costs considerably under $1.00 from some commercial vendors.

However, a valid comparison would have to take into account, for a given library, all the additional costs that would be incurred in turning cataloguing copy from another source into a working catalogue. In any cases, UTLAS would likely still be more expensive. Two other factors would then have to be reviewed.

The first concerns the quality of the catalogue product. Without wishing to attribute unnatural perfection to UTLAS, the variety of its services, together with the availability of a working system of authority control do combine to make a superior product possible. Such an evaluation can best be made in the context of the individual library's review of its circumstances, requirements for quality, budget and specific proposals from the various alternative possible sources of cataloguing.

The second factor is related to the library's broader anticipation of future automated developments. A by product of the use of UTLAS is the construction of a machine readable data base. Such a data base is at the heart of any future integrated library system or sharing of resources. A library which has little intention of automating other functions in the short to medium term may find this to be of little significance. For a library which does, the additional real cost involved, if any, may prove to be an investment rather than a loss.

COMMERCIAL VENDORS

Introduction

The major alternative to the utility is the commercial vendor of catalogue copy. These commercial sources of cataloguing data are for the most part associated with book jobbers, which have used the service as a loss leader. However, we are beginning to see the emergence of a new type of commercial vendor, of which MARCIVE is here reviewed as an example, to whom the provision of cataloguing copy is their primary business, and the supply of materials, if done at all, a secondary matter. Type of service from the commercial vendors in general, ranges from a very traditional, card only record provision, to computer based systems which provide machine readable records. In some cases the vendor will maintain a file of items acquired. In most cases the records provided are restricted to the data bases made available by the national agencies, and only for materials purchased from the jobber. This is a major disadvantage. Any situation in which a library finds itself tied to a single supplier for all or the majority of some service, leaves it unable to take full advantage of the competitive nature of the book business, and the library supply business in general.

In some cases the commercial vendor maintains a cataloguing staff for original cataloguing, but this is not true in every instance. In the case of most American jobbers the data base is largely restricted to LC output in printed format. As libraries turn more and more to the purchase of material in a wide variety of non print formats, this disadvantage will become more marked. Often the availability of cataloguing records is tied to purchase of processing. The costs for all these services are far from easy to establish. To the extent that firm rates may be quoted, they are usually complicated by the availability of many options, and subject to various discounts depending on volume of business, range of services purchased and tenacity of the librarian in seeking them. The prices quoted below are taken from recent price lists of the companies involved, supplemented by direct contact with the vendors. They are all subject to variation for the reasons given.

The major commercial vendors include Baker and Taylor, Brodart, Blackwell North America, National Book Centre, and John Coutts (service not available to public libraries, and therefore not reviewed here). An interesting alternative is found in MARCIVE, a fairly recently established supplier in the southwest U.S., which provides cataloguing information only. The appearance of MARCIVE may signal the growth of a new competitiveness in the provision of cataloguing data.

BAKER AND TAYLOR

Baker and Taylor Company, a subsidiary of W.R.Grace and Company, a major American corporation, is a U.S. book and library service vendor cum jobber, with Canadian representatives. Head Office is in Somerville, New Jersey, although there are supply depots throughout the United States, (but none in Canada), and the company has been in business for nearly a hundred years. One of the continent's largest jobbers, in the past two decades it has been building an automated service as an adjunct to its book supply business. At present, it offers an automated cataloguing service, and LIBRIS II, an automated acquisitions service. The company will only provide cataloguing for items purchased from Baker and Taylor. Cataloguing is supplied on cards. For users of LIBRIS II, it can be supplied in machine readable format. The company also offers a range of processing products. In any review of the sources of cataloguing copy, Baker and Taylor must be considered, if only because they have been successful in capturing so large a share of the market.

Scope of the Data Bases

The company's data base is primarily generated from the LC MARC record. This amounts to 1,500,000 entries, mostly dating since 1968. In addition the data base contains about 350,000 records originated by Baker and Taylor staff, mainly for materials ordered by customers. There are as yet, relatively few if any special data sources, such as NLM or audio visual materials, in the data base. However, Baker and Taylor does supply cataloguing kits for audio visual materials ordered through the company, and this will eventually result in a better representation of such materials in the data base.

Access

Access to cataloguing copy from Baker and Taylor, as for most commercial vendors, is a very different matter from access to a bibliographic utility. In relation to a utility, a client library becomes in a sense a partner, and access is usually via an on line communication link, or perhaps a batch process. In relation to the commercial vendor, however, the library is normally a customer, and access is simply a question of asking for and hopefully receiving the copy, which may be in machine readable, but more usually in some physical format. Cataloguing records are automatically supplied for any designated item purchased from the company, if the library has opted to purchase the service. There is no on line access, except for LIBRIS II. You order the book, and you get the cataloguing. The process of ordering includes the completion of a specification sheet, which permits selection of a variety of cataloguing and processing options.

Machine readable cataloguing is available from Baker and Taylor. A series of options can meet specific requirements. The library may elect to receive all MARC data, MARC data except CIP or only CIP data. Records are not supplied if they are not available on the MARC file, but there is a variable back order period, extending up to 180 days, during which the company will continue to search for the data, as new MARC tapes are received. The standard specifications for magnetic tapes are ASCII character set, 9 track, 1600 BPI tape format, and undefined recorded format. Alternate specifications may be negotiated.

Cataloguing information

Baker and Taylor supply whatever copy is in the data base at the time the book or other item is purchased. In some cases, this will be the full MARC record. In others, however, it may be the somewhat less comprehensive Cataloguing in Publication record. The charges for each are the same, and the latter is not subsequently updated. If the item is not in the data base in either form, Baker and Taylor's own staff catalogue it, and the subsequent record is supplied.

Cards are produced directly from unedited MARC tapes. They are not changed to agree with printings or other variations. Thus libraries, who require these refinements, must supply them in house. The additional cost of this must be included when comparing Baker and Taylor's price with others.

Options

Baker and Taylor offers three types of cataloguing: Dewey/Sears; Unabridged Dewey/LC and LC/LC, with a fairly wide variety of format options. No authority control system is available. A number of options are also available for processing products, including full processing, jacket and kit unattached, attached kit, unattached kit and catalogue cards only.

Other

The company does not offer a retrospective conversion service, or cataloguing for material not purchased through it. Original cataloguing input occurs indirectly, only as customers order material not found in Baker and Taylor's data base, and in any event, the company does not maintain unique user files.

Prices

Full processing, including a complete set of catalogue cards is listed at U.S. $0.99 ($1.20 Canadian). Jacket and kit unattached is $0.89 ($1.10). Attached kit is $0.79 ($1.00). Unattached kit costs $0.69 ($0.88). Card sets cost $0.50 ($0.60) each. The MARC record in machine readable format is $0.15 ($0.20) per record. However, the question of book discounts for material purchased from any jobber complicates any analysis or comparison with other vendors, because companies may balance costs in one area against those in another, may provide "loss-leadersX", and so on. The cost of in house procedures must also be taken into consideration, since the vendor's prices do not represent the full cost of cataloguing, for purposes of comparison with utilities, or with in house automated systems. The major additional cost is the staff component involved in the other half of cataloguing, the assembly of the individual records into a catalogue. This may entail either filing cards, or loading in machine readable data, and subsequent cost of product generation. Any changes made to the cataloguing record as produced from Baker and Taylor specifications, to meet local standards would also entail additional costs. The average cost to file and check one set of cards, is approximately $1.11, assuming a salary rate of $8.00 per hour (including fringe benefits at 12%).

General Comments

Baker and Taylor is an extremely well known book vendor and supplier of cataloguing copy, whose customers include libraries in Alberta. Its virtues include inexpensive supply of cataloguing copy. For the smaller library, with less need to be concerned over the niceties of cataloguing exactitude, the service is adequate. For larger libraries, and for libraries concerned about building a consistent data base for future development, a closer examination of all the costs involved should be undertaken. Many of these are found in the present study and its companions.

BRODART

Rivalling Baker and Taylor in size, Brodart Inc. (in Canada, officially known as Bro-Dart) adds to the functions of book and associated service vending, that of furniture, equipment and supply. This U.S. company is based in Williamsport, Pennsylvania, and has a Canadian office in Brantford, Ontario. Its clients include many Canadian libraries of all kinds.

Scope of the Data Bases

Like Baker and Taylor, Brodart has built a data base, largely derived from LC MARC cataloguing, and does not include CANMARC. When cataloguing is not available from MARC records Brodart will provide cataloguing from the National Union Catalogue, at a special rate. This service is optional. There is a limited amount of original cataloguing performed, but there is no contributed input from customer libraries. Brodart does not generally advertise the overall size of its data base.

Access

Brodart has two types of processing services or loose processing kits for books ordered from the company. One is for school or small public libraries, and uses abridged Dewey and Sears. The other, called TECH-SERVE, is aimed more toward academic libraries; it provides LC subject headings, and either LC classification, or unabridged Dewey.

The former provides simplified cataloguing and offers computer produced processing materials. Cataloguing cards are annotated.

TECH-SERVE offers cataloguing for all titles distributed by the Library of Congress, through the MARC English Language Monograph subscription service, including cataloguing in publication data. Titles likely to be in high demand, but not included in the MARC program are catalogued and classified by Brodart's professional staff, and added to the TECH-SERVE data base. If cataloguing information is not available in the data base, the customer is not charged for the computer search, but there is no report on unavailable titles, and there is no back ordering.

When kits are ordered without books, any one of three different reference indicators may be used to identify the item for which copy is required. These are the ISBN, an eight digit Brodart number, or the author/title/publisher.

Machine readable cataloguing is not available as a regular service, but the Brodart file has on occasion played a part in special automated projects, beyond the simple supply of cataloguing copy.

Cataloguing Information

Brodart does not just supply the unedited MARC record. MARC data is examined prior to first use. Obvious errors and ommissions are corrected and incomplete LC call numbers are completed. This service is supplied at no additional charge. The original cataloguing input by Brodart staff is MARC compatible.

The two alternative cataloguing services provide a choice between simple and relatively complete cataloguing copy, which is further expanded by the various options described in the succeeding section.

Options

Options in cataloguing permit headed or unheaded, numbered or unnumbered cards, along with a series of choices relating to Dewey classification and author letters. Prefix letters for reference materials may be selected, and for LC classification the options permit choice of classification for fiction, law, and series, as well as call number format. Number of main entry cards per set may vary also. Title cards are always provided.

Unlike many vendors, Brodart does allow a library to order kits only, without the book or other item. In this case, kits arrive ordered alphabetically by title, which enables the matching process to be carried out more expeditiously. The special cataloguing service for materials not available in the MARC programme, is not supplied for the kits only service.

Retrospective Conversion

Because Brodart will supply copy without purchase of material, it could in theory be used as part of a retrospective conversion project. However, since the copy is not normally available in machine readable format, it would only constitute one intermediary step in the process, and it is unlikely that this alternative would prove to be cost efficient. However, Brodart is amenable to special contractual arrangements for such projects. The Houston Public Library for example, did carry out a large part of its retrospective conversion project in conjunction with Brodart, using its COM records and tapes, at a reported cost of $0.10 per title in 1977. It is not known what the hit rate was, but certainly this price is low enough to be worth further investigation should circumstances in Alberta warrant it.

Original cataloguing

Because of the nature of Brodart's service, there is no original cataloguing by clients. Brodart staff do contribute some original cataloguing copy to the data base.

Prices

Brodart's various advertising brochures quote a bewildering variety of prices and options, for which it is not always possible to determine whether U.S. or Canadian dollars are intended. In general, Brodart prices fall within a range comparable to most other commecial vendors, but considerably less expensive than bibliographic utilities.

According to Brodart's price lists, kits consisting of cards, labels and pockets, but without books, range in price from approximately $0.60 to $0.75, depending on the number ordered. A $1.00 handling charge is applied to orders of less than 50 kits. Cataloguing and processing, attached to the book, costs $1.38 each. Cataloguing and processing for application by the library's own staff cost $1.00.

The special rate for cataloguing supplied from available LC cards or the NUC is U.S. $2.00 in addition to the regular charges listed above.

As was described in the review of Baker and Taylor services, it should be noted that these prices do not consitute the whole cost to a library, of constructing a catalogue, and that in addition, various discounts may alter the prices given here, or in Brodart literature.

General Comments

In essence, the services supplied by Brodart are very similar to those available from Baker and Taylor. The main differences that do exist relate to items that do not appear in the MARC data base. In the case of Brodart, copy can be obtained at an extra charge, for some of these materials. In addition, Brodart does perform some upgrading of the copy, to correct minor errors and omission. Brodart also will catalogue high demand materials not included in the MARC programme. Unlike Baker and Taylor, Brodart does not attempt necessarily to provide cataloguing for everything ordered through the company. On the other hand, it will supply copy without the purchase of the relevant item.

MARCIVE

Marcive, originally developed in coperation with Trinity University Library, San Antonio, Texas, is a commercial company providing customized catalogue cards, labels, book and microform catalogues and machine readable records from Library of Congress, National Library of Medicine and U.S. Government Printing Office Monthly Catalog Tapes. The company provides retrospective conversion and original cataloguing services. It also maintains archival data bases for libraries. MARCIVE has recently come into prominence in Canada, partly because of its association with EasyData, which selected it as a preferred option for input of cataloguing data. Formerly an off-line service, it has now developed with EasyData an on-line interface for use in batch mode.

A basic difference between MARCIVE and the other commercial vendors reviewed, lies in the fact that the business of this company is primarily to supply cataloguing copy, and this is not done simply as an adjunct to another side of the business. In some ways, it is more similar to a bibliographic utility, a major difference being its profit making nature, however. MARCIVE a new development in the commercial supply of cataloguing copy, which if successful, amy be expected to be followed by others.

Scope of the Data Bases

The data base includes about 2,500,000 records. For comparison, this exceeds the reported size of the Baker and Taylor data base, but is less than half the size of the UTLAS data base. These records comprise multilingual monographs, serials, and audiovisual materials from LC MARC. Post 1968 coverage is virtually complete. Pre 1968 coverage is rapidly increasing. The data base also includes CATLINE (National Library of Medicine tapes), and U.S. Government monthly catalogue tapes since 1976. However, National Library of Medicine AVLINE tapes are not yet available.

From a Canadian point of view, the major disadvantage of the data base is that it does not include complete coverage of Canadian materials. CANMARC is not available, and only those materials catalogued by LC and other U.S. agencies, will be found in the data base.

Access

Because the data base is founded on MARC records, access may be by ISBN, ISSN, and LCCN, and this can be done by the customer library, both on and off line. However, we understand that the on line link is only available for those customers using EasyData. Author/title searches cannot be performed. The NLM citation number be used, as may be the U.S. Government Monthly Catalog entry or GPO stock numbers.

Cataloguing information

All MARCIVE output is in the form received by it. Most monographs records are in ISBD(M). MARCIVE sets up profiles according to library specification, and will vary the output accordingly. However, additional information beyond that included in the original catalogue record received by MARCIVE is not provided.

Options

Libraries can specify in advance a unique call number, location symbol or an accession number for any single title by identifying this information with the search number to be used. These items will be included on the cards in their proper location, at no extra charge.

In addition to the options on the profile form, for any particular type of card (shelflist, main entry, title, etc.) numerous others can be requested: for example, print or not print ISBN; print or not print heading on top of card; print more than one card, or none of any type. There is some flexibility for additional options.

Retrospective conversion

Retrospective conversion in the MARCIVE system is a two step process. The first is the familiar process of using numerical keys, such as ISBN, to search for matching records in the MARCIVE data base. This can be done in batch, or on-line for EasyData users. It is dependent on the library's being able to supply these indicators. Because author/title searches are not available, some libraries may find this to be a problem. "Hits" are added to the library's data base in full MARC format and are ready for use with products, authority work, etc. MARCIVE quotes an estimated hit rate of 70% - 90%, but this is probably higher than would be experienced by Canadian libraries.

Non-hits can be keyed into the system by MARCIVE, working from a worksheet completed by the originating library. In this process, the library retains control over the quality of the input

MARCIVE will also undertake to complete the entire conversion process, working from microfilmed shelflist cards. No cost estimate for this is provided, but it is described as "considerably higher" than the alternative. Regardless of the method selected, the resultant data base is in standard MARC II communications format.

Original cataloguing input

There are two methods of inputting catalogue data for new acquisitions. Possessors of EasyData can transmit search keys online for searching the MARCIVE data base, and utilize "hits." For non-hits, and for other libraries, original cataloguing must be carried out using a MARCIVE worksheet. Any type of material can be catalogued in this way. The inputting library controls the standard and level of copy, subject, of course, to conformity with the overall MARC standard. Concomitantly with this freedom will come a certain effect on the quality of the overall data base.

Other

MARCIVE will maintain individual bibliographic record files for subscribing libraries, at no extra cost. These data are available for the production of book and microform catalogues.

Prices

Catalog cards (LC, Dewey, NLM, GPO)	$0.085ea
NLM data base use	$0.18/title
Labels (spine, pocket, book card)	$0.02ea
Handling	$0.40/order
Original cataloguing (approx)	$1 - 1.25/title
Original cataloguing worksheets (tablet of 25)	$1.00
Acquisitions list with card order	$0.10/title

On line batch search (EasyData interface)

Transmission costs (N.B. It is estimated that total sending and receiving for 150 requests is thirty minutes)	$10.00/hour
Record cost (per item requested)	$0.11

Recalls of data for book catalogues, microfiche and microfilm catalogues and union lists are implemented upon specific request. Cost estimates for these services are available only to requesting libraries.

General Comments

The services available from MARCIVE combine features of both bibliographic utilities and those of traditional commercial vendors. In respect to prices they are much more similar to the lower rates of the vendors. At the same time, at least certain client libraries obtain some of the advantages of direct interaction with the data base, normally not available in the commercial environment. The wide scope and coverage of the MARCIVE data base is also worth noting, as is the fact that the company maintains individual library data bases, and leaves original cataloguing in the hands of client libraries. The arrangement this company has concluded with EasyData is unique, and probably a precursor of the future, whether with MARCIVE or with similar organizations. As a method of getting data into an in house system, it seems well worth investigation in depth.

NATIONAL BOOK CENTRE

The National Book Centre is a Canadian jobber, operating out of Toronto. Although a commercial corporation, it also displays some characteristics of a societal agent, concerned with the development of Canadian culture, as exemplified by Canadian publishing and the agency system. As far as possible, NBC fills orders with Canadian editions. Cataloguing is only available to accompany material purchased through the Centre's acquisition service known as BABS (Book Acquisition Service). The Centre does not provide a computer based cataloguing service. In essence, to the customer it is a traditional, manual wholesaler and cataloguing service. The customer has at present no possibility of obtaining cataloguing records in a machine readable format. Normal trade discounts are available.

Scope of the Data Base

NBC produces cataloguing from National Library of Canada microfiche, and MARC fiche. Records are searched and keyed into a DEC PDP 11/70 and used for product generation. The company is giving some consideration to mounting LC and CANMARC tapes directly. The company also inputs some original cataloguing copy.

Access

There are six ways to obtain materials, and hence cataloguing, from NBC.

New and Forthcoming Canadian Books. This publication appears semi-annually, and contains order blanks. The completed catalogue, together with a purchase order can be returned to NBC.

New Friends. This twice-yearly publication concentrates on children's and young adults' materials. Ordering is done in the same way as for New and Forthcoming Canadian Books.

New and Old Friends. Each January this list of recommended books for children and teenagers appears, containing about 11,000 titles. Ordering is done in the same way as for the previous two.

In Person Ordering. The Centre's warehouse contains about 15,000 titles, and librarians may selct from these direct, for later delivery with cataloguing.

Direct Mail. Orders may be sent direct to NBC for individual items or as batches.

Standing Orders. This service is provided for some 2,000 serial monographs.

The nature of the National Book Centre - a standard Canadian jobber - is such that machine readable data, and computer access is not available. Unlike Coutts, for example, there is no tie-in with a computerized utility.

Cataloguing information

The Centre catalogues print material in the English and French languages, but service is not available for other languages, or for newspapers, periodicals, music scores, government documents, technical reports, vertical file materials, maps, out of print items, remainder titles, audio-visual materials, and some paperbacks. The company's policy is stated as follows:

> We undertake to catalogue all quality paperbacks, providing this service has been requested; however, we reserve the option to reject any mass-market paperback title that, in our opinion, should not be catalogued.

The Centre also supplies cataloguing only for those materials purchased there.

The Centre uses AACRII, the 19th Dewey and the 11th Abridged Dewey. The following combinations of subject headings and classification are available:

1. Abridged Dewey and Sears
2. Unabridged Dewey and Sears
3. Unabridged Dewey and LC

For Canadian materials, the Canadian Companion and the Canadian Subject Headings from NLC are also used for subject headings

Customers cannot input original cataloguing, since the system is not automated (in the sense that the utilities, for example, are). Nor is there any provision for retrospective conversion projects.

Options

In addition to the Full Cataloguing Service, options include:

1. Processing Only
2. Jacket Only
3. Provision of sensitive devices for security systems

Options exist for treatment of biography, fiction, easy reading, cuttering, and others. There are various invoicing options available. The company has been planning to implement a computerized budget control system. This would consist of volume and dollar counts for order placed, fulfilled and cancelled, and total dollars committed. There is also a pre-publication service.

Other

Full Cataloguing and Processing provides book plus set of catalogue cards covering main entry, shelf list, subject entries, added and title entries; one attached spine label; one attached high cut pocket, with call number on adhesive label; one charge card with label; and one plastic jacket. Because classification is only available in Dewey, the Centre would not be convenient for libraries using LC - many academic libraries for example.

Prices For Full Service Sets

Abridged Dewey/Sears	$1.59 per volume
Full Dewey/Sears	$2.11 " "
Dewey/LC Subject	$2.89 " "

For $0.25 less, each of these alternatives can be obtained in loose kit form. Price breakdown as between cataloguing and processing is not available.

General Comments

NBC cannot be compared quite on an even basis with other commercial vendors. To those libraries for which the company's objective of supporting the Canadian publishing and distribution system is a desirable societal goal, the level of prices, scope and coverage of service will require comparative evaluation with this in mind.

The service available from NBC is fairly simple, and not extensive in its range of offerings. The lack of a machine readable record option renders this company, like a number of the commercial vendors, less attractive to those libraries which are contemplating a move into automated systems of one kind or another. Outside of this context, use of NBC, together with one of the major American vendors would enable a library to obtain quite complete coverage of the bulk of its acquisitions, at a moderate cost.

NATIONAL LIBRARY MARC DISTRIBUTION SERVICE

Since 1976, the National Library of Canada has been making MARC records available across the country. This is a cataloguing service only. No processing service is available. It is also one of the few sources from which cataloguing data can be obtained separately from the purchase of the book or other item concerned. There are eight options.

Selected MARC records/unit catalogue cards
Retrospective cumulations
CAN/MARC authorities tape service
Canadiana Tape Service
LC MARC tape service
UK MARC tape service
CONSER tape service
INTERMARC tape service

Selected MARC records/unit catalogue cards

This is a batch service, which allows libraries to send lists of titles to be run against the National Library's source file of over 2,000,000 records, from Canadiana, LC, British Library, INTERMARC and CONSER. Cataloguing records for hits are then provided on magnetic tape. Serials and monographs are handled separately. For Canadian libraries, however, only one fee is levied if the two are ordered together.

The price for tape output is $15 per batch, plus $0.06 per hit. If the National Library supplies the tape, there is an additional $6.00 charge. For unit cards, the price is $15.00 per batch plus $0.13 per hit. Tape and unit cards cost $15.00 per batch, plus $0.19 per hit. For both of the latter two, the cost includes production and supply of one unit card. This, together with the following option, constitutes the servce most likely to be of interest to the librares involve in this study.

Retrospective cumulations

This option allows libraries to request complete or partial retrospective files or records on the MRDS master files. Both source file and the beginning and end dates of the period covered must be supplied. The resulting cumulations are supplied on magnetic tape in Canadian MARC communications format. However cumulations will not be supplied to include records available through a current annual tape submission. Canadian libraries may request records other than Canadiana monographs and CAN/MARC authorities. Such requests are met only as resources permit.

The price of this service is $225.00 per submission, plus $18.00 per tape output, and $0.003 per record output.

CAN/MARC Authorities Tape Service

This option consists of tapes issued once every two weeks containing authority records for name and uniform title headings used in Canadiana, Canadian name headings authenticated by the National Library of Canada for the Library of Congress, and name and uniform title headings authenticated by the National Library as part of the SHARAF (SHARed Authority File) project of UTLAS. Records are distributed in the Canadian MARC communications format for authorities. Yearly subscription (April 1 - March 31) wih annual invoicing. Price: $325 per year.

Canadiana Tape Service

This option consists of weekly tapes of the monograph records appearing in Parts I,II,VII, and VIII of Canadiana. The records are distributed in the Canadian MARC Communication format for monographs. Yearly subscription (April 1 - March 31) with annual invoicing. Price: $350 per year.

LC MARC Tape Service

This option consists of weekly tapes of monograph records received by the National Library from the Library of Congress and converted to the Canadian MARC Communication format for monographs. The option is only available to Canadian subscribers. A yearly subscription costs $1450.00

UK MARC Tape Service

The National Library supplies weekly tapes of monograph and serial records it receives, produced for BNB. The records are distributed in the appropriate Candian MARC format, and the yearly subscription is $900.00

CONSER Tape Service

Every four weeks, tapes are issued, containing CONSER records from OCLC, in Canadian MARC format for serials. The tapes contain all CONSER records authenticated by the National Library or the Library of Congress. A yearly subscription costs $225.00

INTERMARC Tape Service

Tapes are supplied monthly, containing records of monographs, issued by the Bibliotheque Nationale. The records are converted to Canadian MARC, and the subscription cost is $200 per year.

General Comments

Specifications. Tapes are available in 7 or 9 track, except for CAN/MARC authorities which are only available in 9 track. They come in both 800 and 1600 bpi, and in ASCII code only. Unit cards are 3" by 5", 220M, with bottom centre-punched holes. Invoicing is done after service, or subscription received. All communication, outside Ontario and Quebec, is by mail, although the National Library is willing to consider telecommunications where feasible.

Most of the output from National Library Service carries with it the requirement to be able to load and work with a sizeable data base from which to search for specific records desired. For the libraries concerned in this study, such useage is unlikely to be either possible or of high priority. However, the University of Alberta's project to implement DOBIS would perhaps facilitate the option at some stage.

OTHER SOURCES OF CATALOGUING

In addition to the cataloguing sources reviewed in detail in the preceeding sections, there are a number of other agencies which Alberta libraries might well consider when comparing external sources. The following sections give brief information on the more important of these.

OCLC

Incorporated in 1966, as the Ohio College Library Centre, OCLC began as a non profit corporation serving the academic libraries of Ohio. It evolved into a semi public corporation, as an increasing number of libraries outside the state, across the U.S. and in other countries began to find its services useful. At the same time OCLC embarked upon a program of expanding and adding to the program applications it offered.

At present, OCLC is the largest bibliographic utility in the world, and constitutes a truly national network. A library may either join OCLC as a member, utilizing its on line communications, or may simply purchase copy from it as a cataloguing source. OCLC's pricing structure is complex, but like the other bibliographic utilities, they are somewhat higher than those from commercial vendors. A medium sized library which catalogues 20,000 items a year, is likely to spend over U.S. $50,000 annually for OCLC charges.

WLN

A relative newcomer on the utility scene, the Washington Library Network began in 1977 as a service to the libraries of the state of Washingon, under the aegis of the State Library. It has stated that it cannot indefinitely extend its on line system beyond the Pacific Northwest. However, this is subject to negotiation, and there is some possibility that a library might be able to use WLN as an on line cataloguing source. The more probable use of this system is by putting up the BLIS software package, a vendor's turnkey version of the Washington Library Network system, which runs on IBM equipment. Data Phase can be linked to this system. The cost of the BLIS software, in Canadian dollars is $375,000. In essence, if this were to happen, a new source of cataloguing copy would have been established within the province of Alberta. Such a project would obviously require the most careful investigation, and appears to us at this time, to be only a remote contingency. Detailed costs of a project of this nature were included in The Alberta Library Network Report, of 1981.

BCLN

The British Columbia Union Catalogue (BCUC) is presently mounting the BLIS package at the University of Victoria, as part of the establishment of BCLN, the British Columbia Library Network. Presumably, when this project is completed, the network will be available as a source of cataloguing copy. However, at this stage, implementation is not far enough advanced for the system to constitute a realistic possibility, and the question of pricing policies has not been addressed. However, because of the dynamics of its establishment, there is reason to think that BCLN prices will have to be at least very competitive with those of UTLAS.

MARC FICHE

The MARC Applied Research Company supplies LC cataloguing data through MARC fiche. All MARC records for books are produced weekly on microfiche. A regularly updated index provides access by main entry, title, LC card number, ISBN and LC call number. Once located, cataloguing copy may be transcribed manually, or copied with a reader printer. The index is cumulated quarterly. Retrospective MARC copy to date, and cataloguing for 40,000 older titles and several thousand films, maps and serials may be purchased as a single cumulation. This initial cumulation is priced at approximately U.S. $200. One year's subscription to the updates costs approximately the same.

BLACKWELL NORTH AMERICA

This company was formed in the mid-1970's, when the British Blackwell bought out Richard Abel, a north west U.S. book jobber and service agency, which possessed, among other assets, a machine readable data base, created over the previous several years, and based on LC MARC, together with some original in house cataloguing.

In the same league as Baker and Taylor, and Brodart, BNA provides another commercial option for Alberta libraries. Its price structure is very similar to those of other vendors of this type.

COSTING THE USE OF EXTERNAL CATALOGUING SOURCES

As we have repeatedly emphasized, the full cost of cataloguing, using externally purchased copy, is not necessarily to be determined, simply by establishing the vendor's price, and multiplying by the number of items purchased. To varying degrees, external copy will require the expenditure of funds on various in library activities, and these must be identified and costed in any library which wishes to determine the true total cost of cataloguing.

There are two phases in the building of a catalogue. the first simply involves the creation of the single record. The second is the combining of these records into a useful product. It is this phase which determines whether or not the user will be able to find that record once it has become a part of the catalogue. The extent to which libraries consider this phase important varies widely. It is at the heart of the debate on cataloguing standards, and always complicates the establishment of a co-operative cataloguing system, or any kind of resource sharing which utilizes a machine readable data base. In determining what is a proper cost for cataloguing, a library must first decide what priority it places on phase two. In particular, in making the decision to automate cataloguing, a library must decide whether the priority placed there in the manual environment, will remain the same in the computer based one. If, as is often the case, the opportunity is taken to improve the quality of the catalogue, then it is to be expected that the cost comparison with the manual environment will be distorted.

The bibliographic utilities provide a service which, if fully utilized, least demands additional in library work, particularly if a microform catalogue option is selected. The commercial vendors generally provide a service which requires more work to be performed within the library, although differences among the vendors, and the options each provides, result in a continuum of possibilities, rather than a dichotomy.

The following list is intended to describe those activities which a library should consider when determining the full costs of cataloguing, using an external source of copy. It is not necessarily the case that all of them will be done, for every external vendor. Some, all, or very few may be, but the essence of the costing process is to review them, and determine which ones are additional to the vendor's service.

Searching copy prior to ordering (for libraries which do some cataloguing in house)

All original and copy cataloguing done in house

Ordering catalogue copy

Receiving catalogue copy

Correction of errors

Insertion of missing data

Modification to suit physical item (e.g. edition, collation, etc.)

Sorting, filing and checking cards

Reconciliation of new name, title and subject headings with headings already in the catalogue

Preparation of history cards

Preparation and maintenance of authority file

Preparation and maintenance of reference network in the catalogue

Withdrawing cards for discarded items

Replacing damaged or missing cards

Updating microform catalogue

Examination of microform catalogue for errors

Product generation costs, if this service is purchased elsewhere

Any in house card production costs (e.g. for additional catalogues, original cataloguing, shelf lists, additional subject headings, etc.)

Payment of invoices

Supervision, administrative and personnel costs of staff performing catalogue related tasks

Cost of physical equipment, furniture and space

SUMMARY

It is clear from the above that the up front costs to obtain cataloguing from the commercial vendors, are greatly cheaper than those from utilities. MARCIVE costs $0.11 for machine readable records, for example, as compared with some $5.00 from UTLAS. One major reason for this differential is that the utilities generally provide a complete working catalogue product, which requires a minimum of in library equipment, while the commercial vendors provide individual catalogue records, mostly without authority control. The card products require modification and change, if a quality catalogue is to be produced. Machine readable records, if available, of course require an in house system capable of using them. Even allowing for all of this however, it appears likely that the direct costs of using commercial vendors are somewhat lower than those of the utilities, depending on the in library salaries, and productivity levels.

There are two trade offs involved. In the case of some commercial vendors, such as Baker and Taylor, purchase of the catalogue service requires commitment to purchase of materials. The vendor thus has a captive customer, and the question of acquisitions and material prices would have to be part of any in depth cost review. Further, any materials purchased from some other source, would have to be catalogued outside the main functional stream, which is always a relatively more expensive undertaking.

The second trade off is that of quality of service, both in the integrity of the catalogue and the individual records themselves, and in the multiplication of catalogues to serve more than one location. It is easier and cheaper to provide ten catalogues using the services of a utility than those of a commercial vendor.

Finally, as addressed in the previous section, the true costs of providing a catalogue must include all the additional tasks and activities necessary to be done in house, or purchased from other sources, in order to turn an agglomeration of catalogue records into a working catalogue. The extent and cost of these may vary widely from one library to another, and are affected by the priority placed by the library on the quality of the public catalogue, as by the level of funding it can devote to the activity, in competition with all the other demands. In the context of preparing a plan for automation of library services, whether independently or cooperatively with other libraries, the decision here requires a library to examine its objectives, and ascertain what it intends to use its catalogue for. The answer in an automated and/or shared environment may well be different from what it was in the manual age. An automated catalogue gives a library, for example, the previously unattainable option of placing catalogues in public places, other municipal agencies, or schools.

Such costing will be particularly difficult in a small library, where the staff are relatively unspecialized. Cataloguing tasks in these circumstances are likely to be divided between the staff, and among the hours of the day in a fairly complex fashion. Still, the work does get done, and it does cost something.

This aspect of costing must be carried out in the individual library, for only there can the precise mix of such functions be determined. Services purchased from outside vendors differ considerably from one to another, and all come with various options and discounts, which mean that a generalized analysis can do little more than indicate the major topics to be addressed, and the general range a library should consider.

TABLES

Table I

Cost Comparisons

Present Cataloguing Systems

Alberta Libraries

Item	Public Libraries	College Libraries
Cost/title		
Range	1.60 - 8.38	2.79 - 18.90
Mean	6.22	9.80
Cost/item		
Range	1.60 - 14.34*	2.31 - 9.81
Mean	5.46	7.84
Titles/FTE		
Range	2090 - 10000	1140 - 6452
Mean	3943	3096
Items/FTE		
Range	1121 - 12353	1663 - 7801
Mean	5820	3879

N.B. These figures include processing costs.

* The library reporting this cost did not provide information from which cost per title could be calculated.

Table II

Automated Systems

Cost Comparisons - Cataloguing

External Sources

Source	1	2	3	4	5
Baker and Taylor	0.60	0.20	1.20	1.10	n.a.
Brodart***	n.a.	n.a.	1.38	1.00	n.a.
MARCIVE	0.085*	0.11	n.a	0.02**	1.00-1.25
National Book Centre	n.a.	n.a.	1.59-2.89	1.34-2.64	n.a.
National Library MARC Distribution Service	0.13/hit	0.06/hit	n.a.	n.a.	n.a.

UTLAS UTLAS provides a 15 page price list. Prices vary based on connect time, method of access, terminal rental, communications line, transaction commands, and many other factors. However, as a guide, the average basic cost per title catalogued ranges from $5 - $6.00. This includes searching the data base, editing, storage of machine records in client file, authority control and catalogue products, consisting of a microfiche catalogue and quarterly supplements, plus one unit card per record.

Key: 1 - card set only
2 - machine readable format
3 - cataloguing plus processing/attached
4 - cataloguing plus processing/unattached
5 - input of original data, supplied by customer

N.B. Prices are quoted in Canadian dollars. In some cases this has resulted in a close approximation, rather than a quoted price, because of fluctuating currency exchange rates. Prices are given in comparable fashion as far as possible. In cases where different cataloguing or processing options exist, price ranges have been shown. Certain additional special charges, such as handling, tape, etc. may also apply.

n.a. = service not available from vendor
* per single card. For the National Library, this is the price for "hits" only.
** per label. No other processing available.
*** price for abridged Dewey/Sears. Other prices for other options.

Table III

Cost Comparisons

Present Acquisitions (Monographs) Systems

Alberta Libraries

Item	Public Libraries	College Libraries
Cost/title		
Range	1.29 - 4.07	1.77 -11.46
Mean	2.70	6.50
Cost/item		
Range	0.47 - 5.99*	3.14 - 5.69
Mean	2.36	4.55
Titles/FTE		
Range	4015 - 41733	1602 - 11300
Mean	11346	5269

* The library reporting this figure did not provide information from which cost per title could be calculated.

Table IV

Automated Systems

Cost Comparisons - Acquisitions (Monographs)

External Sources

Source	
Baker and Taylor	a. LIBRIS II $250/month equipment. $0.25/title. $400 - $800/month minimum. $1200 - $2000/maximum. There are three levels of service available.
	b. BATAB An in house system, costing $600 - $1400/month to link to LIBRIS.
Brodart	No automated service available.
MARCIVE	No automated service available,
National Book Centre	No automated service available. Some computerized budget control capability is being introduced. Prices are not yet available.
National Library MARC Distribution Service	No automated service available.
UTLAS	a. Via library file/Coutts. This ordering system costs about $1.25 title. No minimum or maximum charge. Cost is connect time dependent.
	b. INNOVACQ, a U.S. system has been marketed in Canada by UTLAS since 1982. Hardware/software cost $45 - $100,000. Maintenance costs average 9% per year. Unit costs depend on communications costs to UTLAS as well as number of UTLAS records accessed.

POTENTIAL FUTURE
INTER LIBRARY LOAN TRAFFIC
AMONG ALBERTA LIBRARIES

A Study for

the

Alberta Public Library Directors' Council

by

Dr. David R. Williams

and

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New Westminster, B.C.

March, 1983

EXECUTIVE OVERVIEW

A comparison of inter library loan traffic in Alberta, British Columbia, Great Britain, and various areas of Europe and the United States suggested that a distinction can be drawn between relatively advanced systems and undeveloped systems. In the former typical average per capita rates of use, for all types of library, range from about 0.03 to 0.06. The latter range from less than 0.01 to 0.03. The Alberta figure is close to 0.03.

Components of and critical factors affecting inter library loan systems were discussed, and population projections for the province outlined. These two elements were used to develop a number of possible scenarios for the future growth of inter loan in Alberta, and probable associated costs. Minimum, maximum and intermediate scenarios suggested a potential range of traffic volume by the year 2001, of from about 80,000 to 300,000 transactions, of which from 15% to 25% would be generated through the public libraries of Alberta.

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INTRODUCTION

This study is one of a series of five, commissioned by the Alberta Public Library Directors' Council, whose overall objective was to provide information needed to make decisions about the future of library automation in Alberta. The specific objectives of this study were:

a. To gather data on Inter Library Loan traffic from states, provinces and other parts of the English speaking world.

b. To determine Alberta's projected population growth over the next several decades.

c. To determine the maximum potential inter library loan traffic that Alberta could experience for all types of libraries.

Of particular interest to the Council was some determination of the possible interaction between inter library loan levels and the wider introduction of automated systems in libraries. Much of this must be speculative, in as much as in all but a few instances, where inter library loan has been closely linked to an automated system, it has been in a relatively restricted geographical area. OCLC is the major exception to this pattern. The consultants have gathered information from representative areas and sought to isolate critical factors which affect its level.

PRESENT INTER LIBRARY LOAN TRAFFIC IN ALBERTA

Public Libraries

Public library inter library loan activities in Alberta can be broken into three components:

a. Interlibrary loans through the provincial system

b. Direct loans from resource libraries in response to Zenith information requests

c. Photocopying as a result of Zenith questions

The Zenith system is a toll free telephone line that links all public libraries in the province to a resource library that will answer information requests by phone, loan or photocopy. There are eight libraries, including two regional systems, providing this service. These, plus four others, are also linked by telex to provide inter library loan services in general.

The Alberta Library Services Branch acts as a clearing house for all inter library loans that are not answered by a Zenith request. Table I shows the levels of activity for the past three years.

Table I

Public Library Inter Library Loan

Activity in Alberta, 1980 - 1982

Year	ILLO	% Increase	Direct Loans	% Increase	Photocopies (pages)	% Increase
1980	11424		n.a.		n.a.	
1981	13135	14.97	6465		5398	
1982	17860	35.97	7695	19.02	9754	80.69

It is evident that inter library loan has been increasing. In the past few years it has been growing very rapidly. Whether this can continue in the future is partly contingent on funding available from the Library Services Branch, as well as on local funding support, on automation developments, and on library priorities. Expressed in per capita terms, the 1982 rate for loans excluding photocoped pages was 0.011 compared with .0087 for 1981. When photocopied pages are included, the per capita rate for 1982 was 0.0152, and for 1981 was 0.011. As a comparison, in British Columbia, the 1980 per capita rate for total in province public library ILL was 0.0036.

The current resource sharing agreements end in March 1984. At present, in theory, all interlibrary loan requests are channeled through the Library Services Branch. However, at least one public library goes directly to a university for some requests. It is also quite possible that Edmonton and Calgary could use UTLAS to obtain holdings information, and thus bypass LSB. Thus the official figures may be underestimating the total traffic.

According to the Alberta Library Network Research Project Report, in 1981, the total volume of ILL in the province for the previous year was close to 65,000 annually. This included both public and academic libraries. This would suggest that academic, special and other non public libraries in 1980 accounted for some 30 to 40,000 inter library loans, or nearly twice as many as the public library total. The study also reported that Alberta librarians interviewed stated that fast inter library loan was one of the first priority services.

The emphasis on speed of delivery bears on one of the critical factors affecting level of ILL activity. Alberta Government Courier Service currently delivers to nearly 150 locations in the province. This service is used for inter library loan delivery throughout the province. However, the Schick Network Study Report's forecast of 48 hour turnaround times, using this service, has proved somewhat optimistic.Although the basic service is daily, in some areas courier service is provided only twice weekly. For non public inter library loan traffic a variety of local delivery services is used, together with Canada Post.

Other Libraries

Inter library loan in the non public libraries of the province is less formally organized than is the system established by the Library Services Branch. However there are two co-operative systems in existence. They are the Alberta Government Libraries ILO system, together with the Alberta Government Libraries Union Catalogue, and the Alberta Universities Inter Library Loan system (AUILLS). No central delivery system has been organized for these arrangements beyond the availability of the government courier.

INTER LIBRARY LOAN IN BRITISH COLUMBIA

There are three major inter library loan co-operative systems operating in British Columbia. Between them they serve all public libraries and post secondary academic libraries in the province, with a special fast tracking system for the heavily populated Lower Mainland area. Government, special and other libraries are not included in these agreements, and their inter library loan takes place on the basis of individual requests. The population of B.C. in 1980 was 2,672,400. In 1981 it had increased to 2,744,467.

In a 1980 study of B.C. libraries, The Library Management Group noted:

> FIN...is a system operating among the GVLF libraries plus U.B.C. {NET} is a system organized by the academic libraries in which GVLF has expressed some interest. The establishment of a provincial library network should take into account the existence of these two. Many public libraries could participate in them without waiting for all components of a network to be put in place.
>
> The study attempted to determine the total number of recorded incoming inter library loans in 1979. However, this task could not be accomplished. Some libraries did not record this activity. Some GVLF libraries did not distinguish between FIN and other inter library loans. Some libraries did not count Open Shelf borrowing, while others counted Open Shelf loans but not the remainder. The raw total figure ascertained during the study was 18,398, excluding most FIN loans. Open Shelf lending from (its own) Victoria (collection) amounted to some 7,000. FIN loans during 1979 totalled 8,613. It is interesting to note that users borrowed approximately half a million more items from GVLF libraries outside their own municipality, in the same year.
>
> Whichever way one considers the ILL figures, and with whatever caveats, they amount to a small number when compared with direct circulation. For many libraries, therefore, inter library loan is not "real" in the same way that circulation is. That is where their work lies, where their bread and butter is. But this need not be the case. It is at least possible that the low level of activity represents the locations problem together with the lack of an effective mechanism and delivery service. In the GVLF libraries, prior to 1975, such inter loan was considerably smaller than has been the case since establishment of the Federation's delivery system. In BCUC the availability of locations information was accompanied by an increase in inter library loan, in some cases a dramatic increase.

Open Shelf

The Open Shelf division of the Library Services Branch offers resource back up from its own collection of over 120,000 items and also serves as an inter library loan clearing house, for public libraries of the province outside the Lower Mainland and Victoria areas. The division also offers block loans from a multi lingual collection and a large print collection. Under an arrangement with the Ministry of Education the division provides service to correspondence students throughout the province. The division also offers direct mail loans to individuals not served by a library.

Volume of all transactions in 1979 was 35,000, and declined to about 33,000 in 1980. In 1981 and 1982, the decline continued. The per circulation staff cost in 1979 was $1.19. This was a relatively high figure, reflecting the fact that the service was largely delivery oriented. The division undertakes to search for titles in the Victoria area, in response to requests from B.C. libraries outside the two major metropolitan areas. Several catalogues are searched, but not the B.C. union catalogue, despite the fact that requesting libraries sometimes do cite locations from the BCUC fiche. If a book is found to exist in a Victoria area library, a staff member borrows it, for mail to the requesting library. The process is labour intensive in the extreme.

In addition to the 35,000 loans from the Open Shelf HQ in 1979, there were another 3,500 inter library loans processed by the branch offices.

Federated Information Network (FIN)

The Greater Vancouver Library Federation consists of eight associated member libraries in the Lower Mainland region of British Columbia. It was established in 1975, at which time FIN was also created. This is one of the Federation's programs for the sharing of library resources, in this case on an inter library loan basis. No union catalogue of holdings exists, other than Richmond's involvement in BCUC, and a small number for Burnaby. Until recently, the system utilized dedicated telephone links which permitted staff to phone around to determine location information and place ILL requests. The system was thus based on a somewhat hit and miss method of borrowing, and resulted in a large proportion of requests being satisfied by the Vancouver Public Library. The telephone network has now been replaced by an electronic network, the telephone system's Envoy 100. Each library has a computer terminal for this purpose. GVLF subsequently entered into a contract with U.B.C. for the provision of resource material as a supplement to FIN.

FIN provides for the third component of inter library loan systems by provision of a system courier, which shuttles daily between the member libraries and U.B.C. Turn around time is therefore relatively short. In the early years the system headquarters was used as a switching point for materials for the colleges, to and from which individual college libraries would move inter library loan materials and audio visual themselves.

The total volume of FIN transactions in 1979 was 8613. this declined to 6880 in 1980, but increased again in 1981 to 9133. In 1982 it again declined to 7849. The 1982 figure did not include 1277 loans and 1988 xerox pages from U.B.C.

NET

This system was established in the mid seventies by the academic libraries of the province in response to a decision by U.B.C. to institute charges for inter library loans. The Ministry of Education was persuaded to offer start up funding to the project, which recompensed U.B.C. for the central co-ordination costs of operating the system and unit costs for libraries which were net lenders. There are twenty one college and institute and three university libraries participating in NET. Unit costs cover the central co-ordination costs and the costs incurred by the lending library. Costs in the borrowing library are paid by it and not recorded. The initial level of the unit cost was $5.36 and was established as a result of a study carried out by U.B.C. In 1983, unit costs have increased to $7.50. In the initial years, Ministry funding was used to re-imburse net lending libraries the unit amount for each net loan made by the library during one year. Thus a library which lent 1000 items, and borrowed 900 items, would receive a payment of $750. Net borrowers would receive and pay nothing.

Subsequently Ministry funding was withdrawn. The system now operates with member funding. Net lenders receive reimbursement calculated as before, with current unit costs. Net borrowers, however, must now pay the unit cost for each item borrowed above the total number of items lent. All accounting and billing is done by the central office.

The arrangement was facilitated by the existence of a union catalogue. The system operates out of U.B.C.'s inter library loan office, to which academic libraries may submit their requests, with holdings information attached. Libraries may also submit requests directly to potential source libraries. However, NET statistics do capture the full transaction volume for academic inter loan. The effectiveness of the system is also limited by the fact that while the BCUC includes full holdings for all the colleges and most of the institutes of the province, its holdings of the university libraries are less complete, as their retrospective conversion projects are not yet complete.

Initially the members of NET used telex to transmit requests and other messages between each other and U.B.C. This has recently been replaced by some members with an electronic messaging system - Envoy 100. Envoy costs, at an average of $0.35

per loan, have been found to be substantially less than telex charges, at an average of $3.80 per loan.

NET has no overall delivery system of its own. Delivery in the Lower Mainland area is accomplished by the local courier and delivery systems of the individual members, of which there are several. For the remainder, Canada Post is used.

The central office at U.B.C. has kept detailed records of both costs and transaction patterns, since the inception of NET. One effect which has been identified is a change in the borrowing patterns from those in existence before BCUC and NET were established. Prior to this time, only 0.5% of items were provided by the colleges and institutes. Subsequently the colleges and institutes provide 20% of the total traffic amongst academic libraries in B.C. Table II sets out some inter library loan activity figures for B.C.

While it is true that academic inter library loan has different characteristics from that in public libraries, this change of pattern has been observed in public library situations also, where the holdings of smaller libraries have been made accessible. Studies in Illinois, and in New York's Mid-York Library System, for example have evidenced this. In part it arises from the existence of unique titles in these libraries, in part from a conscious effort to spread the lending load, as costs increase, and net lenders' reluctance to subsidise the service also increase. In part, too, it arises from a feeling in some libraries, that better service may be obtained from smaller libraries not burdened by a very large volume of inter library loan business. Finally, there is the possibility that delivery may be quicker from a library which happens to be near by. For Alberta, therefore, one might anticipate that if even a partial provincial union catalogue were to come into existence, incorporating the holdings of smaller public libraries, a similar shift would occur.

Table II

Inter Library Loan
Activity Figures For B.C.
1979 - 1982

	1979	1980	1981	1982
LSB****	38,500		26,878***	27,811***
Per Capita	0.0347		0.0224	0.0222
FIN	8,613	6,880	9,133	11,114*
Per Capita	0.0103	0.0082	0.0109	0.0133
NET	n.a.	n.a.	18,095	14,606
Universities**	n.a.	n.a.	8,500	8,500
Total			62,606	62,031
Total Per Capita			0.0228	0.0222

n.a. - figures not available.

* Includes 1277 loans and 1988 xerox pages from U.B.C.

** In addition to NET figures

*** These figures include correspondence loans to individuals and block loans to libraries. If these are excluded, the percentage of total provincial inter library loan attributable to public libraries (excluding the Victoria regiona) is close to 20%.

**** LSB does not service the Vancouver area, part of which is included in the FIN figure, or the Victoria metropolitan area for which no figures are available.

INTER LIBRARY LOAN IN BRITAIN

Inter library loan patterns in Great Britain today spring from considerable historical development, and a pattern whereby a national system for its orderly provision was established. In the 1970's, the system underwent considerable change. The establishment of the British Library Lending Division and subsequent extension of its coverage, local government reorganization, the beginning of extreme financial constraints on libraries, and rail and road transport in addition to postal services combined to create these effects.

The volume of loans has been steadily increasing, despite fluctuations in each direction in any single year. The patterns however, vary from region to region. Inter library loans statistics for Great Britain are notoriously difficult to obtain in a consistent and complete manner, and overall statistics have been reported only since 1977. Those which do exist indicate that for the country as a whole, the total public plus academic per capita rate of requests is 0.06. The rate in the London area, which in part at least, includes an academic component, is only 0.0286. Interestingly this is very close to the North Suburban System, Illinois rate of 0.0333. In both these cases, however, the region is populated very densely, and is favoured with a multiplicity of libraries, so that reciprocal and walk in borrowing is much more feasible, and certainly quicker. In the North Suburban System reciprocal borrowing alone numbers over 1,000,000 annually, or 0.66 per capita. Consequently these lower rates of inter library loan can most probably be interpreted as the residual demand after this high level of in region and individual borrowing has been satisfied. In the London area, too, the rate would be increased if the full academic level were included.

Table III sets out some recent figures for British Public Inter Library Loan. The addition of other components raises the national figure to 3.5 million, an overall per capita rate of 0.06. This compares with a total of 700,000 in the Netherlands, a per capita rate of 0.05, and 1,700,000 in the Federal Republic of Germany, with a per capita rate 0.0269. Also of interest is the fact that in Great Britain 70% of inter library loans are supplied by the British Lending Library, 10% from public libraries, 9% from academic libraries and 8% from other sources. A survey in 1977 reported that only a third of all requests was for monographs and fifty six per cent for serials. Half the demand came from academic libraries, only sixteen per cent from public libraries and a third from other libraries. Public library demand is overwhelmingly for monographs. 79% of all public library requests were for books. In academic libraries two thirds of the demand was for serials, and one quarter for monographs.

Table III

Regional Public Library Inter Loan

1981/82, Great Britain

Selected Regions

Area	Total Requests	Per Capita	Satisfied (In region)	Satisfied (BLLD)*	Satisfied (Other)	Unsatisfied
Ireland	69045	0.045	10,814	45268	7087	5876
LASER**	197713	0.0286	110445	52477	22405	12386
Scotland	131855	0.0255	18966	86673	14012	12204
Wales	51127	0.0184	3758	35768	7523	4078
Yorkshire	99509	0.0253	4803	70487	15954	8265

* British Library Lending Division

** London And South Eastern Library Region

INTER LIBRARY LOAN IN THE UNITED STATES

During the first half of the century the large American libraries believed that the goal of collection completeness was possibly within reach. Inter library loan existed but was mainly the province of academic libraries. The code of borrowing generally took the position that ILL was a privilege and that privilege was closely restricted. As the decade of the 1960's drew to a close, however, U.S. librarians began to realize that there was no library that would possibly be able to reach anything near this state of self-sufficiency in its holdings. Public libraries began to feel a responsibility to provide an inter library loan service much more wide ranging than in the past. It was at that point that the library community began to look at new mechanisms that would permit more effective resource sharing to take place, and heated arguments raged over how the costs of each might be met. Libraries hoped that this resource sharing would bring some control to the rampant growth of collections and satisfy the needs of patrons who refused to be content with the holdings of their own library and to accept the idea that they should not have fairly easy access to the ever-growing world of publication. Three resource sharing strategies were examined. The choices are:

1. A centralized structure of government funded resource libraries, such as the British Library Lending Division.

2. A decentralized approach based on improving access to existing collections through automated techniques, combined with a more sophisticated method of order and delivery for inter library loan.

3. A combination of the above.

In the United States there is virtually no central planning, funding, controlling or coordinating authority guiding the development and activities of libraries. U.S. libraries are highly decentralized, each having its own mission and goals and each getting its funding from a different public or private source. The federal government has played a minimal role in the development of libraries and the same might be said of funding.

In this environment it is not difficult to see why the decentralized alternative grew to be accepted. Certainly no centralized resource library has appeared in the United States and it is unlikely that one will.

The major and driving force behind the development of the wide variety of consortia, computer networks, cooperatives, and ILL systems that have appeared in the last twenty years appears to be the large degree of flexibility, initiative and freedom of action displayed by the librarians and governing boards of the thousands of independent libraries of all types that exist in the United States.

In the last two decades, with academic libraries leading the way, three major computer networks, and over twenty regional networks have grown up to provide service to over 2,500 libraries of all types. There are countless local networks based on automated circulation systems. These systems are completely the creation of the libraries now using the services, their growth was pragmatic and effective.

The three major computer networks are OCLC, WLN and RLIN. The largest of these, and the one selected for review in this study is OCLC. In addition, a review of the North Suburban Library System, Illinois, was carried out.

OCLC

Founded in 1967, OCLC has built a comprehensive data base of over six million bibliographic records and serves as an on-line union catalogue. The data base is growing at the rate of over 30,000 records per week and now serves almost 2,300 libraries with over 3,000 terminals. OCLC established an Inter Library Loan Subsystem in 1979. The subsystem facilitates the verification of bibliographic information, the location of holding libraries and the routing of ILL requests. It is not supplemented by a document delivery system, and users find that the time and effort in physically transferring material is a serious impediment to the process.

Even before the advent of the subsystem the use of the OCLC data base had resulted in an increase in the level of ILL and to spread the load over a larger number of libraries. The traditional net lenders were relieved of some portion of the load. Use of the subsystem resulted in further rapid growth of ILL during the initial years and in a further spreading of the load. By 1981 the number of requests had levelled off at about 3,500 daily.

The load levelling brought with it its own set of problems. While the large net lenders were delighted to see their share of the traffic decrease, many small libraries were not so delighted. They found themselves receiving ILL requests for the first time, but after the initial satisfaction discovered that being a net lender, while it may have some glory, is a substantial burden. Five Ohio public libraries who have recently joined the ranks of the net lenders introduced a $5.00 charge for each item loaned to a non- Ohio library.

Brett Butler, the author of Beyond the Library, has formulated Butler's Law, which says "Libraries cannot tolerate marked increases in the "success level" of their operation." OCLC libraries have discovered this to be true of the interlending process. ILL, whether manual or automated, is expensive.

NORTH SUBURBAN LIBRARY SYSTEM

This is a consortium of two hundred and fifty libraries in Illinois, including the system headquarters. Sixty six of these are public libraries. The remainder are academic, school and special libraries, which hold affiliated status. This status permits reciprocal borrowing and inter library loan access. The system was established in 1966, and began operations in 1967. It serves a population of over 1,500,000, covering an area of 850 square miles. Two groups of the public libraries are involved in automated circulation. The first group, which now numbers 23, operates the Co-Operative Computerized Circulation System (CCCS). A second group of five libraries operate independent standalone CLSI systems, which have dial up access to each other and to the CCCS. The primary purpose of the system is for circulation, but the North Suburban System places a heavy emphasis on resource sharing and regards the on-line circulation system as the primary tool for effecting such sharing. The system uses CLSI LIBS 100.

In 1977, NSLS initiated its participation in the Illinois State Library sponsored Interconnect Project. This was established as a demonstratioon of the feasibility of the use of computers to locate holdings and place inter library loan requests by use of electronic mail. The project was funded from a federal grant, and included the State Library, Northern Illinois, Rolling Prairie and Suburban library systems, and certain associated agencies, which also link it to the rest of the state network.

Studies of the project suggest location search time was reduced by up to six hundred per cent, a 20% increase in number of items located, and reduction of time in placing the request from several days to less than one day.

During the first three years of operation, volume hovered just under 40,000 transactions annually. The per capita rate at that time was 0.0294. The current per capita rate of inter library loan in the area served by NSLS is 0.033, a total yearly volume of 50,000. This in itself is a medium to high rate. Noteworthy, however, is the additional in region reciprocal borrowing total of over 1,000,000. It is also to be observed that this system is not yet in full operational mode, as part of the data base is still in union card catalogue form at the system's headquarters, representing the holdings of those libraries in the system which are not yet automated.

FUTURE INTER LIBRARY LOAN TRENDS

Introduction

After many years of inter library loan which relied on cumbersome union card catalogues, or even on blind borrowing, in North America and in Europe the development of automated library systems has begun to create a different kind of system. The traditional inter library loan system in Canada and the U.S. was informal, free, but hedged about with restrictions, in which most academic and many larger public libraries participated, but from which smaller public libraries were often excluded. One of the authors of this report can recollect an inter library loan request from a fairly large regional library system which was rejected by another library on the grounds that it honoured only requests from scholarly libraries.

However this attitude is changing as the attitude toward the library as a resource has developed. With the tremendous increase in the number of publications which has taken place since the Second World War, and the gradual realization by every library that the attempt to acquire a complete and fully self sufficient collection is doomed to failure, there has developed an awareness that the collective library collections of the nation form a national resource. Increasingly it is felt that users and their libraries anywhere should have access to the total regional or national resource.

This of course is quite a different matter from the assertion characteristic of the 60's that any citizen anywhere was entitled to receive the same quality of library service. Like the attempt at all-embracing collections, this noble aspiration received a rebuff as the reality of the cost implications became apparent. For a time, there then developed a belief that inter library loan could be used to supplement the regular bookstock, that by buying different titles, and borrowing them from each other, the costs of comprehensiveness could be avoided, while the provision of all things to all readers could be continued. This attempt too has had to be abandoned, with the realization that above three inter library borrowings of the same title by one library the expense of the process rises above the costs of acquiring the title in the first place. On occasion one sees in the literature the suggestion that facsimile transmission or electronic document delivery can reduce these costs. In our opinion there are two reasons for doubting that this will happen at least in the next five to ten years. In the first place, the technology for both electronic reproduction and for facsimile transmission is primitive. Secondly the copyright problems are only just beginning.

It seems apparent then, that while access to library collections across the nation is to be accepted as reasonable, it will in practice only continue to be feasible on a national, and perhaps provincial and state scale, primarily for titles of limited appeal. Under the aegis of smaller networks, however, one

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would expect that inter library loan would expand considerably, but not without limit, beyond the present level in Alberta. And the experience in other areas, outlined in this study, supports this suggestion.

One reason for the expectation of greater inter loan in such networks lies in the observation that the traditional inter library loan system was based on the holdings of the largest libraries. As a result, they did not represent the true extent of the resources available. The system was unable to take advantage of the fact that, as experience has shown, small and medium size libraries often have rich collection resources, with considerable unique titles. For example, the Houston Area Library System recon project resulted in only a 50 - 60% hit rate for the holdings of the smaller participants, the remaining 40 - 50% representing unique items. Statistical analysis of a sample of titles submitted by academic and public libraries to the Louisiana Numerical Register proved that there is no large scale duplication of titles among Louisiana libraries. Of over 72,000 titles, almost 60,000 were unique and only eight titles were held by as many as nine of the sixteen participating libraries. In addition, borrowing patterns were distorted, and time delays were experienced, in obtaining material from far away which might be held locally. An undue burden was placed on the larger libraries. Because of this, as time has gone by, area inter library loan networks have come into being, some libraries have opted out, and some have levied charges.

Alberta in 1983 exhibits the characteristics of a semi developed inter library loan network, and its per capita rate of activity reflects that status, being in the middle level of the less developed areas' characteristic range of up to 0.03. Area networks such as PNBC, BCUC and the various Alberta systems are becoming aware, however, of the same kinds of pressures which led to their original development. Costs continue to be troublesome. In some Alberta libraries inter library loan is rarely advertised, and is considered as an extension of reference service, not as a circulation service. There is incomplete linkage between different kinds of libraries, and delivery systems are only partly in place. The future level of inter library loan in the province is contingent on these and a considerable number of other factors, which are discussed in the following sections.

The Basic Components of an Inter Library Loan System

There are four primary components of an inter library loan system, whether it exists in the form of an organized network, or as a free form traditional mode of exchange. They are the availability of holdings information, a communication system, the availability of materials and a delivery system. The nature of each of these will affect the future of the service in Alberta.

Availability of Holdings Information

Availability of holdings information is critical to the successful operation of any inter library loan system. The process involved in sending a request to a system headquarters which forwards it to a resource library is both time consuming and costly. A disproportionate number of requests are forwarded to large academic libraries, with no guarantee that materials exist in those collections and with no means of assessing whether the material was available from another library which is located closer to the borrowing library. In addition the lending library in such a situation is forced to search its own catalogue to see if it has the title and to identify the call number. One of the advantages of a union catalogue in any format is that it enables the request to be sent with full identification, including local call number, thereby reducing the cost and time burden to the lending library. If the union catalogue is accessible to the borrowing library, then this cost and time burden is transferred to it, and both the lender and the system Headquarters, if any, can operate much more effectively.

The National Library was at one time attempting to maintain a national union card catalogue in Canada based on the holdings of any library which would send records of its holdings to the National Library. Indeed this catalogue still exists, but is becoming superseded, as are other more limited regional union catalogues, by other developments.

The major factor has been the development of the UTLAS data base, which can be accessed from anywhere in the country, and which contains the records of many libraries which did not contribute to the National Union Catalogue. Although UTLAS does not have a true inter library loan subsystem, it has, in effect, become the national union catalogue. Recognizing this, many libraries have switched their search procedure to verify the UTLAs data base first before the National Union Catalogue. Even the National Library has a terminal for searching UTLAS. Many large libraries ceased making contributions to the National Union Catalogue in hard format, but make their records available in machine readable format. This caused a furore when first mooted, but is now recognized as a sensible approach. In conjunction with UTLAS, more limited catalogues have become available in off line format. They include the British Columbia Union Catalogue, catalogues of large public libraries such as Edmonton, and various regional and other systems.

Even though the UTLAS data base can easily be searched, the lack of an inter library loan subsystem, such as that possessed by OCLC, limits its use. For Alberta, a provincial system could probably supply the great majority of materials, more cheaply and more quickly. There are several alternative future possibilities which can affect the Alberta forecast. The first is that a large proportion of the province's holdings become recorded in an on line data base, most probably UTLAS. The second is that although no single union catalogue develops, many libraries create their own machine readable systems, so that their holdings become accessible to other libraries, either on line, or in physical format, such as fiche. In this event, small libraries could obtain each of these catalogues for in library search. A third possibility is that no basic change will occur. The large city and regional holdings will be accessible, but not those of the remaining libraries.

Communications System

The second component of an inter library loan system is the method of communications between the participants, and with the system headquarters, if there is one. In the early days of inter library loan this was almost always by mail. Nearby libraries would supplement this with telephone inquiries. The introduction of standard protocols and forms for transmission of requests helped to speed this intrinsically slow process. This was the pattern in Alberta and British Columbia until comparatively recently. The next step in improving communications was taken with the establishment in some jurisdictions of system headquarters, perhaps with a union card catalogue, through which requests would be transmitted. The NUC, PNBC, the British Columbia Library Development Commission and the Saskatchewan Provincial Library service are examples of this approach. Another step in the improvement of service was taken with the introduction of teletype and dedicated telephone line communication to speed the requesting and verification process.

More recently, electronic messaging has come into use. The earliest version of this was in OCLC, whose participants began to search on line, and communicate on line. In Canada, UTLAS provides this possibility, and the telephone system has now introduced the Envoy 100 system, used by a number of libraries. Another version of this idea is the linked micro computer system. Here, libraries complete inter library loan requests on floppy disk during the day. At night, the micros communicate the requests between libraries. This system is in use in Montana. In a fully advanced version of an electronic system, the borrowing library will in effect complete an inter library loan request on line, including all pertinent information. This is stored by the system and transmitted to known holding libraries, in succession until the request is filled. In a less advanced version, if holdings information is not available, the request may be shuttled electronically from participating library to library until a "hit" is achieved. In the case of OCLC and CLSI, this capability has been married to the data base.

Availability of Materials

Completeness of holdings information, supplemented by a speedy communications system will make an effective inter loan system only if the desired item actually exists somewhere in the system, and is available to the requesting library. The rate of satisfaction of requests varies considerably. In Great Britain, overall success rates of over 80% are reported, though regional success rates may be considerably below this. In London, in 1981/82, the in region success rate was 51%. In Wales, it was just over 7%. Studies of multitype regional networks in California, New York and Ohio, in 1975/77, reported that 34 to 61% of requests were filled in region.

The degree of satisfaction depends firstly on the collections in the network. A multi type system with libraries which are well supported and developed over a considerable period of time is obviously more likely to be able to supply more items. Secondly, the libraries must also be willing to supply materials to other libraries. This has not always been the case. When the pattern of borrowing changes and non traditional lending libraries are called upon to supply materials, they sometimes balk. In Alberta today, some smaller libraries have indicated apprehension about the demands on their resources, both material and staff. A third factor to be considered, even with good collections and willing libraries, is whether the item is actually on the shelf. This is the tremendous benefit of inter library loan systems when tied to circulation systems, which indicate not only which libraries have the desired item, but which libraries have it in at the moment. Obviously, high demand items are less likely to be easily and quickly available, and this fact supports the cost argument against the probable future extension of inter library loan to "best selling" materials as a general support to circulation service.

Delivery Service

The final critical component of an inter loan system, and the one which has often been the Achilliest heel of all is the physical transmission of the item. This is most commonly done by mail. However, this is costly and slow. In local systems, couriers are often used, sometimes with a switching point where materials can be transferred for pick up and collection. With the advent of photocopiers, some requests were more easily handled by the postal system, when only a few pages were involved. This is particularly useful for academic libraries, where serials borrowing predominates, but less so for public libraries, where monographs are in greatest demand.

Facsimile transmission has been tried. The first attempts in the sixties were slow, taking up to a minute to transmit one page. In addition they were costly, because of the length of communication time required. More recent experiments are reported to be quicker, but definite results are not yet forthcoming.

In any event, analogue facsimile is likely to be replaced by computer based transmission. This, however, is subject to the 30 mile limit as a reasonable distance for cheap computer communication. Given the attention that has been paid to the implementation of cheap and speedy communications systems, good holdings information, and the development of an attitude to collections as regional and national resources, it is clear that the provision of a really good delivery mechanism remains the one outstanding difficulty for inter library loan. In Alberta the government courier has proved a partial solution. It would be much less effective if volume increased substantially. How the province decides to handle this aspect of inter library loan will play a large part in determining the future of the system.

Other Critical Factors

The four factors discussed constitute the primary components of the system. However, there are a number of other matters which will play a part in the development of inter loan.

Population density

There is some evidence to suggest that the concentration of population in a small area can reduce the incidence of inter library loan, by increasing in person demand. Both in LASER and in the North Suburban Library System, there seems to be some element of this factor at work. In Alberta there are two major population centres, with a number of smaller centres. The degree to which Alberta population comes to be concentrated in the two metropolitan areas may affect the level of inter library loan.

Library population density

As population concentrations grow, so does the establishment of a sophisticated library system, including public and academic libraries and various special libraries with unique resource collections. These library resources may also reduce the demand on inter library loan, both by making more materials available locally, and by their availability for in person borrowing or consultation.

Promotion of service

The way in which inter loan service is advertised by the library to its users affects the level of activity. At present in Alberta, the service is generally not actively promoted, but is used passively as an adjunct to the reference service. To some degree this is probably attributable to the way the service and the associated Zenith lines have been conceived and funded. However, there is some suggestion that smaller libraries in parts of the province do not welcome inter library loan as much as might be expected, partly because it appears to intrude upon local selection policies, and partly because of its potential impact on local collections.

Central co-ordination

An inter library loan system may well exist with no central direction. Traditional systems have operated in the absence of a union catalogue simply by sending out requests to libraries most likely to be able to fill then. The inefficiency and costs of such a random system are reduced when some agency undertakes to act as a clearing house. Such a central agency may or may not maintain a union catalogue, and may or may not enforce ageed upon guidelines and protocols.

There are two types of centrally co-ordinated system. The first is that just described. The second adds to the co-ordination function, that of maintaining a central lending collection also. A prime example is the British Lending Library, which fills some 70% of all print inter loan requests in Britain, from its own resources. An agency with a central collection has a built in ability to influence co-operation. Such a central collecion would no doubt be exceedingly difficult to establish from scratch.

The effectiveness of a central agency without a collection is dependent on the willingness of system participants to accept communal decisions. A multi type library network is likely to be more difficult to co-ordinate, owing to the different governance structures, financial circumstances, clientele and objectives they will possess.

In Alberta the Library Services Branch acts in some respects as a central co-ordinating agency, but this appears to be only a subsidiary function, and does not at present extend to non public libraries. No effective central collection exists.

Subsidy funding

The willingness of libraries to use inter library loan is directly related to the costs of the service. It has been suggested that a maximum unit cost of between $5.00 and $10.00 is the highest that is likely to be tolerated by the majority of libraries. In British Columbia, the present (partial) unit cost is $7.50, and there has been observed a reduction in the rate of growth of use of the service.

One limiting condition is the ratio of cost of acquisition to the cost of ILL. For a book costing $15.00 to purchase, and another $5.00 to catalogue, it is counter productive to use inter library loan if it is likely to be required more than three times - and that not per year, but over the probable life span of the book, which could be tens of years. From this point of view, if a library took the long view, even a book which will only be used once every ten years might be better bought than borrowed. Of course the majority of books can not be bought at any given time, and one can conclude that there will always be a need for ILL.

Because library funds for inter loan come directly at the expense of the book fund, it is highly probable that the financial allocation will always be severely limited, bearing in mind the relative productivity of borrowing versus purchase which was just outlined. Libraries will tend to meet more fully the needs of the majority of users, rather than of the minority whose more specialized needs are likely to require inter library loan service. Where borrowing and lending is fairly evenly distributed among participants, no financial transfer may be required, as each library simply provides the requisite staff time, and postage/delivery costs. Such was the case when only research and large public libraries participated. It is becoming rarer, however, and this trend will continue. It follows, therefore, that the growth of a provincial inter library loan network will encounter a natural limit, unless subsidy funds are provided by another agency taking a view broader than that of the individual library. Subsidy of inter library loan by provincial or national libraries is one possibility. A central library governance authority is another. Governments have been known to turn to inter library loan as a salvation from the spiralling costs of library acquisitions. Initial subsidy funding does not always last, however, as was experienced in British Columbia. Subsidy funding is provided to public libraries in Alberta. The extent to which this is continued or increased will affect the development of the system.

Other factors

There are several subsidiary considerations which may play a small role in the Alberta context. One of these is the demographic profile of the population, including age, education, soci-economic status, literacy rate, etc. The increase of population in Alberta will be partly by increase of the existing population, partly by immigration. To the extent that the latter lowers the general educational profile, the growth in demand that would normally accompany a population increase may be reduced.

The number of books per capita, and the level of acquisitions in libraries will directly affect the need for libraries to look outside their own collections. Another minor consideration is the possession by libraries of various ancillary equipment, such as photocopiers, microform readers, micro computers, cassette recorders, etc. as inter library loan requests for non traditional formats increase. This is tied to the general level of funding for libraries.

Characteristics of an effective system

The preceeding sections have discussed those factors which affect the probable volume of traffic in an inter library loan system. Another consideration is how well a system actually operates. An ideal automated system has been described as having the following characteristics.

1. A large, easily searched bibliographic data base, using complete MARC records for citation information.

2. The ILL component of the system automatically links the bibliographic record with the request form.

3. Displayed multiple holdings information in orderly geographical groupings with each bibliographic record.

4. Linkage to on line circulation data for items requested, in order to eliminate unnecessary delay.

5. A minimal amount of interaction with the system as a request is routed online to holding libraries in sequence.

6. Options for regional network arrangemants to incorporate centralized or decentralized routing protocols.

7. Quick response to requests through incentives such as financial reimbursement or quality monitoring.

(1981 On Line Services, Danuta A. Nitecki. Reference Quarterly, Fall)

PROJECTED FUTURE INTER LIBRARY LOAN TRAFFIC IN ALBERTA

Population Projections

The purpose of this section is to set out a determination of Alberta's projected population growth over the next several decades. This section is based largely on Statistics Canada projections of the population of Canada, the provinces and territories based on the 1976 census results and issued in 1979. Published results are not yet available from the 1981 census and these are not expected to be available until 1984. The projections cover the period 1976 - 2001.

Four main projection series are presented in this section. Each is based on an analysis of different possible trends in the main components of population change: mortality, fertility and migration. These projections are depicted in Table IV. Statistics Canada selected these four possible scenarios after an examination of the various possible combinations of assumptions. It is an attempt to provide a range of plausible alternatives for the future population of Canada and the provinces. Statistics Canada has noted certain highlights of the growth of the Canadian population between now and the end of the century. One of these highlights is of particular interest to Alberta:

> According to ... projections, the order of the various provinces with regard to their size will not be altered in 2001; Ontario will continue to be the largest province, Quebec would stay second, although its relative importance will be reduced. British Columbia and especially Alberta will increase considerably in relative size.

General Methodology

Various assumptions have been made by Statistics Canada with regard to the components of population change. In the final analysis a single assumption was given for mortality, two for fertility and twelve (three international, four interprovincial) possible alternatives for migration. Combinations of these assumptions were made and four projections were issued:

Projection 1 This assumes a slight increase in fertility rates. For Canada, the replacement level total fertility rate of 2.1 is achieved by 1991. Net international migration to Canada is assumed to average 100,000 per year (175,000 immigrants-75,000 emigrants). The pattern of interprovincial migration is assumed to return to the "long-term" pattern observed during the 1960's by 1981-1982.

Projection 2 This assumes the same increase in fertility as Projection 1, but net international migration is taken as 75,000 per year (150,000 immigrants-75,000 emigrants). For interprovincial migration, a partial reverse back to the "long-term" pattern is assumed to occur by 1986-87, but in addition, the shift in migration away from Ontario to Alberta and British Columbia is assumed to continue.

Projection 3 Here it is assumed that fertility will continue to decrease so that, for Canada, a total fertility rate of 1.7 is achieved in 1991. Net international migration is again assumed to be 75,000 per year. Interprovincial migration patterns are assumed to partially revert back to the "long-term" patterns observed during the 1960's.

Projection 4 This assumes the same decrease in fertility as Projection 3. Net international migration is taken as 50,000 per year (125,000 immigrants-75,000 emigrants). The pattern of interprovincial migration observed during the period 1975-1976 to 1977-1978 is assumed to continue for the duration of the projection period.

A year by year projection of the growth of the Alberta population is presented in Table V. To the four projections described in some detail in the preceding section, three supplemental projections have been added. Projection 5 is based on the following assumptions: an international net migration of 25,000 people per year, a moderate level of interprovincial migration and a fertility rate moving towards 1.7 children per women. It differs from Projection 3 only in the level of international net migration. It was constructed in response to those users who considered that the drop in the level of international net migration may well have signified the emergence of a new long-term trend. Projection 6 combines zero international and interprovincial migration with higher fertility assumptions and Projection 7 zero international and interprovincial migration with lower fertility assumptions.

Table IV

Population in 1976 And
Projected Population for 2001
Four Projections

1976 Census	2001			
	Projection One	Projection Two	Projection Three	Projection Four
1,838,000	2,835,000	3,540,000	2,893,000	3,080,000
	54.2*	92.6*	57.4*	67.6*

* Growth (%) between 1976 and 2001

Table V

Seven Population Projections

For the Province of Alberta

Year	Projection		Projection		Projection		Projection
	One	Two	Three	Four	Five	Six	Seven
76/77*	1838.0	1838.0	1838.0	1838.0	1838.0	1838.0	1838.0
77/78	1901.4	1898.8	1897.7	1895.1	1892.5	1860.6	1859.5
78/79	1961.0	1961.4	1955.2	1952.3	1944.6	1883.6	1881.0
79/80	2016.5	2026.0	2010.3	2009.3	1994.1	1907.3	1902.4
80/81	2067.5	2092.4	2062.6	2066.0	2040.9	1931.5	1923.5
81/82	2113.9	2160.6	2112.3	2122.7	2084.8	1956.1	1944.6
82/83	2155.4	2230.8	2159.2	2179.2	2126.0	1981.2	1965.6
83/84	2196.9	2302.6	2205.9	2235.5	2166.7	2006.5	1986.4
84/85	2238.3	2375.8	2252.1	2291.5	2207.1	2031.9	2006.9
85/86	2279.5	2450.2	2298.0	2347.0	2246.9	2057.2	2027.2
86/87	2320.3	2525.6	2343.2	2402.0	2286.0	2082.3	2047.1
87/88	2360.7	2601.9	2387.8	2456.1	2324.4	2107.0	2066.4
88/89	2400.4	2677.4	2431.4	2509.3	2361.7	2131.2	2085.1
89/90	2439.4	2752.0	2474.0	2561.4	2398.0	2154.8	2103.0
90/91	2477.6	2825.6	2515.4	2612.1	2433.1	2177.7	2120.0
91/92	2514.9	2897.9	2555.5	2661.4	2466.8	2199.8	2136.1
92/93	2551.1	2968.6	2594.4	2709.2	2499.2	2220.9	2151.4
93/94	2586.1	3037.6	2632.0	2755.6	2530.4	2241.1	2165.8
94/95	2620.1	3105.1	2668.4	2800.6	2560.2	2260.4	2179.4
95/96	2653.0	3171.0	2703.7	2844.3	2588.8	2278.8	2192.2
96/97	2685.0	3235.4	2737.7	2886.5	2616.3	2296.5	2204.2
97/98	2716.2	3298.5	2770.8	2927.5	2642.6	2313.5	2215.5
98/99	2746.7	3360.3	2802.8	2967.3	2667.8	2330.0	2226.3
99/2000	2776.5	3421.1	2833.8	3006.0	2692.1	2346.0	2236.4

* Actual population figures for 1976/77

N.B. Population figures in thousands

Table VI

Projected and Actual Population Growth

In Alberta 1978 -1982

Year	Minimum Projection	Maximum Projection	Actual Population	Difference From Maximum
1978	1881.0	1961.0	1954.2	-6.8
1979	1902.4	2026.0	2012.5	-13.5
1980	1923.5	2092.4	2078.5	-13.9
1981	1944.6	2160.6	2237.3	+76.7
1982	1965.6	2230.8	2315.1	+84.3

N.B. Figures in thousands

Table VI compares the actual growth of population in Alberta with projections that were made in 1976 and preceding years. It is apparent that growth in 1978 to 1980 was falling behind the projections. Since then, however, the real increase has been dramatically in excess of the forecasts.

Inter Library Loan Traffic Projections

In forecasting the potential future volume of inter library loan traffic in Alberta, the impact of each of the factors isolated as determinants must be considered. The following section outlines various possible assumptions about the major critical factors as a preliminary to the adumbration of several scenarios.

Assumptions about the variables

a. Holdings information. Three basic possibilities exist. A comprehensive machine based union catalogue may come into existence, either within province or at UTLAS. No single union catalogue may be developed, but the holdings information of many libraries may become accessible province wide through the development of local machine based systems. The third alternative envisages little change from the present.

b. Communications. Again there are three major possibilities. The first is the development of a comprehensive province wide system of electronic messaging, in the context of a fully developed machine based inter library loan application. Secondly, sporadic development of electronic linkage may come about, without overall integration. Thirdly the existing system may remain in place.

c. Availability of materials. This element is perhaps best envisaged as a continuum of possibilities, with a continuation of the existing relatively high level of funding for library materials at one end, and a restraint or even depression induced low acquisitions level at the other.

d. Delivery system. It is unlikely that a delivery system vastly in advance over the present one will come into existence in the next five years. The most one might expect would be an improvement of the present system, with expansion to other kinds of libraries.

e. Other factors. Each of the other factors may be analysed to display a range of possibilities impacting on inter loan to different degrees. Population density, availability of subsidies, promotion of the service, etc. will all have their effect.

Three primary possible patterns of development are taken as the basis for forecasting future volume. These are combined with the low, high and medium population forecasts, to provide a range of nine scenarios for Alberta inter library loan, between now and the end of the century.

Scenario 1

In this scenario, the assumption is made that there will be little change from the present organization of the system, and the impact of the various other factors discussed will be minimal. On this basis, the per capita usage of inter library loan would not increase from the present approximately 0.03 level. Table VII shows the effect of this assumption for different population projections.

Table VII

ILL Projections 1986 - 2001

Assuming Little System Change

For Three Population Projections

Year	Minimum Population#	ILL	Medium Population	ILL	Maximum Population	ILL
1986	2385.6	71.56	2402.0	72.06	2525.6	75.76
1991	2489.4	74.68	2514.9	75.44	2897.9	86.93
1996	2568.7	77.06	2685.0	80.55	3235.4	97.06
2001	2617.6	78.52	2893.0	86.79	3540.0	106.2

Statistics Canada Projections in this column have been adjusted by a factor of 1.1654, to reflect the actual population increase that has occurred to date.

N.B. Figures in thousands

Scenario 2

In this scenario it is assumed that considerable development of automated systems will take place in Alberta libraries, but that it will be take place with relatively little overall provincial co-ordination. Many library catalogues will be easily available, whether in printed format, microform, or on line. A variety of communications systems will be used to transmit requests. Delivery service will be somewhat improved. The effect of the remaining factors will be noticeable, but not extreme in either direction. The result of this pattern of development would be to increase the use of inter library loan to a per capita level a little below that found in existing developed systems. The rate assumed is 0.05. Table VIII shows these effects.

Table VIII

ILL Projections 1986 - 2001

Assuming Some System Improvement

For Three Population Projections

Year	Minimum Population*	ILL	Medium Population	ILL	Maximum Population	ILL
1986	2385.6	119.28	2402.0	120.1	2525.6	126.28
1991	2489.4	124.47	2514.9	125.745	2897.9	144.895
1996	2568.7	128.435	2685.0	134.25	3235.4	161.77
2001	2617.6	130.88	2893.0	144.65	3540.0	177.0

* Statistics Canada Projections in this column have been adjusted by a factor of 1.1654, to reflect the actual population increase that has occurred to date.

N.B. Figures in thousands

Scenario 3

The final situation envisaged is one in which an integrated province wide, multi type inter library loan system has been established, with a strongly empowered central co-ordinating agency, possibly buttressed with a central provincial reserve collection. An extremely efficient electronic communications system would have been implemented, integrated with the province's machine readable bibliographic files. A rapid and reliable delivery system would have been instituted. Cost would not be a limiting factor. The per capita rate assumed for this situation is 0.09. This represents a rate some 50% higher than that presently found in developed systems. Table IX outlines this possible scenario.

Table IX

ILL Projections 1986 - 2001

Assuming Implementation of Comprehensive Automated System

For Three Population Projections

Year	Minimum		Medium		Maximum	
	Population*	ILL	Population	ILL	Population	ILL
1986	2385.6	214.704	2402.0	216.18	2525.6	227.304
1991	2489.4	224.046	2514.9	226.341	2897.9	260.811
1996	2568.7	231.163	2685.0	241.65	3235.4	291.186
2001	2617.6	235.584	2893.0	260.37	3540.0	318.6

* Statistics Canada Projections in this column have been adjusted by a factor of 1.1654, to reflect the actual population increase that has occurred to date.

N.B. Figures in thousands

Commentary on the Scenarios

The three possible developments outlined above give an indication of the probable range of traffic volume that can be expected by the end of the century. In the minimum growth model, with a low population increase, inter library loan would increase from its present level of some 60 - 70,000, to 71,500 by 1986, and to 78,500 by 2001. With maximum population growth, inter library loan would increase to 75,700 by 1986, and to 106,000 by the year 2001.

Maximum growth would be attained if a fully automated and effective inter library loan system were implemented, to serve a population which had grown at the highest forecast rate. In this instance, the level of inter library loan would grow to 227,300 by 1986, and to 318,600 by 2001. The two possible extremes of the potential traffic level by 2001 are 78,500 and 318,600.

Potential Future Costs

The potential costs of a traffic increase can be calculated from this information. Inter library loan unit costs for Alberta are not available, but in B.C. are approximately $7.50, excluding staff and pickup/delivery costs incurred in the borrowing libraries. It has been estimated that this unit cost would rise to $12.00, if the union catalogue were not available.

Assuming that costs in Alberta would be comparable to those in B.C. unit costs might be taken as between $7.00 and $12.00 in calculating the unit costs of inter library loan in future scenarios.

Using these figures, then, one can predict that the total provincial costs of a fully integrated inter library loan system, presumably being closer to the $7.00 unit cost, would range from $1,650,000 to $2,230,000, in 2001. Should the unit cost in fact approach the $12.00 figure, provincial costs would increase to the $2,825,000 to $3,823,000 by that time.

On the other hand, assuming the first scenario, with little change from the present system, 2001 costs would range from about $549,000, if the unit cost were $7.00, with lower population growth, to $1,275,000, if the unit cost were $12.00 and population increased rapidly.

Proportion of public library and other library inter library loan traffic

In Alberta today, about 25% of the province's inter library loan appears to be public library based. This proportion is quite high. In Britain the comparable figure is 16%, and in general, the public library proportion seems to range from about 15% to 25%, across a number of systems and geographic areas, although there are some exceptions to this. For example, in the Illinois

Interlibrary Loan System (ILLINET), some 60% of the traffic is generated from the participating public libraries. However one might speculate that some academic libraries in Illinois may also operate through OCLC or RLIN. The reason for the Alberta figure may lie in the relative sophistication of the public library sector, or in the relative lack of advancement of the inter library loan system in the academic sector. Thus, the potential public library inter loan traffic in the year 2001 may be expected probably not to exceed 47,790 to 79,500. The remaining volume would be generated by academic, special and other libraries.

Summary

An analysis of the figures presented indicates that typical inter library loan levels range from 0.01 to 0.06 per capita per year. In areas such as British Columbia and Alberta, where there is some degree of systematic inter loan, but where the three elements are not equally well addressed, and there is no special encouragement to borrow, the rate lies around 0.03. In contrast, in areas where inter library loan systems are well developed and their use is encouraged, the rate ranges between 0.03 and 0.06. The United States, Great Britain and the Netherlands are three examples. For an Alberta population of 2,315,100 (the 1982 estimate), this would suggest at the upper end of the scale, a maximum current inter library loan traffic of 139,000, which is approximately twice the actual current rate. Assuming that the implementation of an integrated, computer based system, with rapid and reliable delivery would raise existing per capita maxima by 50%, the overall limit for potential inter library loan traffic in 2001, with maximum population growth, would be about 318,000, of which a maximum of about 80,000 would probably be generated by public libraries. The total provincial costs of such a system would range from $1.6 to $3.8 million, excluding delivery and other costs incurred within the borrowing libraries. If the present system were to change little in the next twenty years, total provincial volumes of from 78,000 to 105,000 could be anticipated with costs ranging from $500,000 to $1,250,000.

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